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## The Franeker Planetarium*

By H. SIXMA

[*Planetarium has become a familiar word in recent years. The word is not new but it has lately been attached to a new and very unusual instrument. Persons who traveled in Europe, especially in Germany, during the last fifteen or twenty years have watched the development of the Planetarium there. Within the last five years the most thoroughly developed Planetarium, up to that time, was brought to America. It was erected in Chicago, a particularly strategic location during the last two years because of the commemorating of A Century of Progress there. Now a second Planetarium is in operation at The Franklin Institute in Philadelphia, others are being constructed in Los Angeles and New York City, and rumors of some others are afloat.*

*Partly for the sake of continuity and partly for the sake of contrast we present here a description of an older Planetarium, one that is known to relatively few persons.*

*It illustrates the adage that there is nothing new under the sun, or, as might be added, involving the sun.* ED.]

### INTRODUCTION

In going from "The Valk" to the Town Hall in Franeker we see across the bridge a humble house. There is a painted sign above its front door bearing the word "Planetarium." In the rear room of this house is found the planetarium of Eise Eisinga. The room receives its light from the north side through two windows, one on each side of the chimney. Opposite this wall are two closets and a closet bed. The space above the doors of the closets and closet bed has three panels. The middle one and largest is separated from the two others by two pilasters. The room has a double ceiling. The planetarium hangs on the lower ceiling. The clockwork is hidden between the two ceilings. On this planetarium are represented: (a) the six planets known at the time of this invention; (b) the moon which in one month turns about its axis, as well as revolves around the earth and in one year travels with the earth around the sun. The planets are globes half of whose surfaces (the side always facing the sun) are painted a golden hue. Bars hold the globes through grooves which are cut out in circles in the ceiling. Outside the orbit of Saturn is another circle band where a pointer shows

*Translated from the Dutch by N. Iedema.

the apparent place and movements of the sun, the signs, the months, and days.

Nearer the closet bed on the same ceiling are five more circles. On the rim of the middle one are the names of the seven days of the week, each day plainly divided into twenty-four hours. A clock-hand which turns around once in seven days indicates the day and each hour. In the space between the rim and center of circle is a groove where is shown the number of the year. This number remains visible during the whole year and changes on the night of December 31 to a new number.

FIGURE 1.
HOUSE IN WHICH THE FRANEKER PLANETARIUM IS LOCATED.

To the right of the middle circle are two indicators. The first points to the place of the ascending node of the moon; the second to the phases of the moon. Of the two pointers on the left one shows the moon's apogee, the other its place on the ecliptic (distance from Aries).

Above the closet bed in the middle panel is a beautiful hemisphere or sky map bordered by a horizon divided in hours. On this sky map are painted the brightest stars and the ecliptic being divided by the signs along the path where a small sun moves. The map makes daily with the sun a complete revolution. The sun moves also through the ecliptic in one year. This shows the sun's place at any time during the day and

the sunrise and sunset; also which brightest stars are visible in Franeker and their relative positions above the horizon. On the same panel there are two small sectors, one on each side of the hemisphere. The left hand pointer shows the hour of sunrise the other sunset the same as on the hemisphere except that on the sectors the sunrise and sunset time may be seen all day; while on the hemisphere only for a moment.

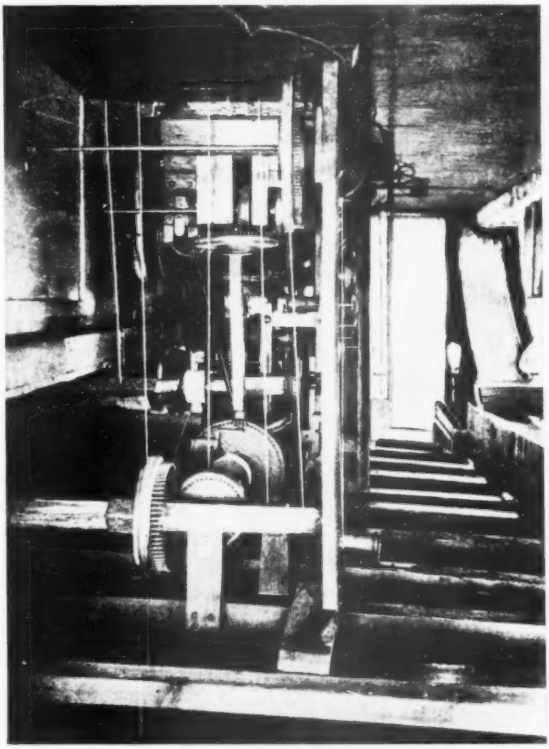

FIGURE 2.
MECHANICAL PARTS OF THE FRANEKER PLANETARIUM.

On the two pilasters on each side of the middle panel are two small pointers. The right hand side indicates the moon's distance from the ascending node; the one to the left gives the moon's distance from its apogee. Finally there is on each panel above the closets a pointer. The left one indicates moonrise; the other moonset.

Here we have a short sketch of what this beautiful masterpiece will do. A great many movements are each properly timed by one clockwork made of four gears. The clockwork of the hemisphere and moon-

pointers, etc., is hidden in the space above the bed and closets and receives its motion from the main clock between the two ceilings. Each part can be disconnected without disturbing the others. The clockwork needs weekly windings.

As the reader may have noticed, this masterpiece really consists of three parts: The planetarium on the ceiling; the hemisphere with its pointers for sunrise and sunset; the moon-pointers on the pilasters on the side panels and on the ceiling. The first of these will be described in more detail. We shall then give a short history of this ingenious artist.

## The Planetarium Proper

If we represent the earth by a globe of one millimeter, the sun would be represented by one of 112.79 mm. The moon by 0.27 mm. The mean distance of the earth from the sun would be 12 meters, and Saturn's distance over 100 meters. No mechanism of such dimensions could be housed in such a limited place. We have, of course, to abandon a plan on such a scale and can only represent the *globes* of the planets in relation to each other. From a good planetarium we may expect the following: 1. The planets have to be at their relative distances in their true places going around in eccentric circles. 2. They have to go around the sun in their proper time. 3. At all times their longitude (celestial), and latitude (celestial), nodes, perihelion, and aphelion must be easy to find. 4. The planets have to travel farther in equal times in perihelion than in aphelion.

The planetarium of Eisinga meets these expectations as we shall see. The grooves where the earth, the five other planets, and the sun or date hand move divide the ceiling into seven eccentric bands. They are fastened with screws to the beams and can be taken down if necessary to get at the clockwork. The rim along the groove of the planets Saturn, Jupiter, Mars, and Earth are divided into signs and degrees; but of Venus into intervals of five and of Mercury of ten degrees. Each planet is shown in its place on the ecliptic as seen from the sun. To see the planet on the ecliptic as seen from the earth, Eisinga has suspended from the sun's center and from the earth's two threads and fastened two golden balls from their ends. The large one or sunball is made of wood; the other of lead. They hold the threads taut. To see the apparent place of any planet as seen from the earth we stand in the room so that the planet in question is seen behind the earth string. Wherever then we see the sunstring cut the ecliptic is the place of the planet. The apparent place is also the true place if the planet is in a straight line with sun and earth.

Outside the circle of Saturn is a seventh groove with the same eccentric circle as the orbit of the earth or apparent path of sun (ecliptic). The outside rim of this groove is divided into two bands: On the first are the twelve months, on the second the days of every month. On the inside rim are also two bands: On the first we see the degrees, on the

second the signs of the zodiac. The indicator points always opposite the earth and shows the days, months, and degrees which the sun appears to have moved through the ecliptic, that is, the apparent longitude of the sun. The earth moves in its orbit with unequal speed. The date hand has to move with equal speed to show the days and with unequal speed to show the sun's longitude; in order to perform this, Eisinga has devised an ingenious plan.

The axial rotation of the planets is not visible on the planetarium but that of the moon's is. The axial rotation of the earth and the phenomena which it causes are very accurately seen on the hemisphere. The side of the moon facing the sun is painted in gold and the other side is dark. It, therefore, shows itself in all its phases. Between one conjunction and the next elapse 29 days, 12 hours, 44 minutes. On this planetarium Jupiter has four moons, Saturn five besides its ring. These moons do not have independent motions. The ring of Saturn is inclined to the ecliptic at an angle of 31° 23′.

## Eise Eisinga

Eise Eisinga, maker of this planetarium, was born in Dronryp in 1744. His father, a woolcomber, made in his spare time a nine-foot two-beam sailboat, a great many sundials, a clavecin, a cabinet organ, etc., besides a lathe for screws, ovals, and pendulum clockwork, on which were made the disks, axles, spheres which his son needed for the construction of his planetarium. This son possessed very early in his youth a great liking for mathematics, to which he devoted all his spare time when not working in his father's house as woolcomber. Once a week he went for lessons to Willem Wytzes in Franeker with whom he studied mathematics, the first six and the eleventh and twelfth books of Euclid and some algebra. Later he had from the same gentleman some instruction in spherical trigonometry, arrangement of the solar system, use of astronomical tables, and in computing eclipses. He never saw any printed books on mathematics or astronomy except the sine tables and astronomical tables of Van der Molen and La Hire. He had access only to the use of his master's writings for aid in developing his own ingenuity. When 17 years old he wrote a book predicting all the solar and lunar eclipses up to 1800. Of those visible in Franeker he made a drawing showing the hour of beginning, middle, and ending of eclipse, also the magnitude. He was married in 1768 to Pietje Jacobs van Hylaard, and established himself as woolcomber in Franeker. When thirty years old it so happened that Jupiter, Mars, Venus, Mercury, and the moon were all at the same time in Aries. In a booklet published in the spring of 1774 it was predicted that this would be fatal to mankind. No wonder this brought great consternation everywhere. Eisinga, who always at the beginning of the year made a table of the positions of the planets for each month, understood immediately that there was no danger in the conjunction of the planets.

This brought him the idea as to what a pleasure it would be to have

an apparatus showing at all times the positions of the planets and he decided to make such a mechanism in his spare time. By request of his wife he fixed the time to make it at seven years. However his time became occupied more and more. In 1776 he became advocate of the city poor and ensign of the city militia; in 1777 councilman and custom collector, and in 1778 overseer of the poor which alone would have kept one busy. However, the planetarium was going in 1778. Everything was first figured out and drawn and afterwards made by him except that his father made some disks and a clockmaker made four copper gears. In 1780 Professor Van Swinden heard about this great work which this modest but ingenious woolcomber was making. He paid him a visit with two of his colleagues and was surprised. Shortly afterwards he came again to make a thorough study of this work and to question Eisinga about it and heard then that Eisinga never saw anything similar nor had any knowledge of the latest astronomical works or calculations, which, if he had known them, would have been a great aid to him in the construction of his planetarium. Van Swinden made it soon known through the Netherlands and Europe how in the small town of Franeker a piece of art could be seen as had never anywhere in the world in that line been seen before. This caused in 1783 a visit to the planetarium by Prince van Gallitzin, and in 1785 by the Duke of Saksen Gotha accompanied by the scholarly Petrus Camper. Also the State of Friesland wanted to do Eisinga honor by presenting him with some object made of silver. Dark days, however, were yet to come to this noble man. In 1787 civil war broke out in Friesland as elsewhere in the Netherlands and Eisinga was drawn into it. He had to leave his wife and two sons and flee to Germany. In 1792 he received permission to return to the village of Visvliet on the Frisian border to resume his trade as woolcomber. His wife had died in 1788. He was not allowed to pay her his last respects. He married again in Visvliet with Tryntje Sikkema. Two daughters were born and he returned to Franeker with them in 1795. As his house was rented he could not take possession until May, 1796. The planetarium stood still for nine years.

Eisinga, already past fifty years of age, always had the hope of some day making a larger planetarium in some great institution. He had the plans ready and at one time as exile offered these plans in exchange for his safe return to his country, but in vain.

He spoke in 1800 about this to Professor G. Hesselink who after visiting the planetarium gave a lecture about it in Felix Meritis in Amsterdam. The wish was expressed to have a large planetarium in this building or another in this city to be made by Eisinga. The idea met with enthusiasm and a certain gentleman d'Amour offered one thousand guilders as part cost, but the many changes in government did not do Eisinga's quiet wish any good. Conditions seemed brighter when Admiral De Winter inspected the planetarium and promised, when King Lodewyk should shortly visit Friesland, to use his influence for a planetarium to be made for the academy in Franeker, but the intended trip of

the king did not take place and the old man was greatly disappointed.

It was a hard blow for him when his eldest son died in 1809. In 1816, after being elected a member of the order of the Nederlandschen Leeuw and thereby protected in his old age against poverty, he drew plans in 1818 for a small planetarium which was made by the farmer Willem Jans Jansen van Dongjum. This was later discovered by a relative in the attic out of condition, but is now to be seen in the same room where the larger planetarium is located.

Eisinga received a bronze medal at the fair in Ghent for a sample of sayette, ample proof that the manufacturing of wool was not neglected. In 1818 Eisinga received a visit from King Willem I and Prince Frederick, and in 1820 from the crown prince. Finally the wish was gratified to have the nation take care of the planetarium and it was bought on December 28, 1825, by order of the king. Eisinga received ten thousand guilders payable in ten yearly instalments, the use of the house and 200 guilders yearly for maintenance, which amount would afterwards go to his son Jacobus Eisinga under supervision of the professor in astronomy of the Athenaeum in Franeker. Later the house and planetarium were given to the city by King Willem III. There is in the town hall a painting made by Van der Kooi, lecturer in the art of drawing at the former university, of the 83-year-old Eisinga. On this life-size half-length portrait the gray thinker sits in an armchair. In front of him a table on which his partly-closed right hand rests. On the table is a drawing of the sun eclipse of September 7, 1820, drawn by him; to the left of him his last small planetarium; in the rear the large planetarium as it appeared April 10, 1827. This portrait in a beautiful frame was given the city on November 13, 1827, by Jhr. AE van Humalda, Governor of Friesland.

In order to transmit the construction of his planetarium to posterity Eisinga has given a full description of it and in particular of each gear and disk. The wish to have it given out in print has up to date never been fulfilled.

Eisinga died August 27, 1828, at the age of 84 years and 6 months, and was buried, as he had requested, in Dronryp. To do Eisinga honor a large tombstone with inscription was placed near the entrance of the church by the Frisian society. We will end this life history of the great Fries with a tribute by Ds. Jan Brouwer that can be seen under a portrait of Eisinga made by Klaas Sannes in 1823.

"See here a Friesian intellect, a picture of Eisinga;
Low was his station, but he was loved for his good qualities.
His mind, striving high by his own power,
Watches the stars. The moon, the sun,
And the universe, which reflect the Greatness of God,
Are mechanically reproduced by his skill.
Van Swinden brings his name to glory before the whole of Europe.
May immortal honor glorify this noble head!"

# Mary E. Byrd

By LOUISE BARBER HOBLIT

Another pioneer in the college teaching of astronomy has passed on. Mary E. Byrd died quietly, almost forgotten, in Lawrence, Kansas, on the thirtieth of July, 1934. Passionately devoted to the science and teaching of astronomy, she was yet for twenty-eight years barred by the very intensity of her devotion to principle and integrity of thought from carrying on the work that was her very life.

Her indomitable spirit thrived from the first on difficulties. Her father, a Congregational minister and a staunch abolitionist, moved his family to Kansas in 1855 when Mary was six. She was ten before any school opportunity came her way, yet four years later she was teaching elementary classes in the school where she studied. College entrance presented many difficulties to women in those early years and, in addition, Mary Byrd earned her college education not once but again and again as one calamity followed another in Kansas and family needs were met first.

After a year and a half at Oberlin College and several years of teaching she entered the University of Michigan as a junior and was graduated with the degree of A.B. in 1878. During these two years at Michigan she found herself one of a group of earnest young women who were pioneers in coeducation. Of these Alice Freeman, afterward Mrs. Palmer, became perhaps the best known, but it is said that in their discussions of the serious questions of the day Mary Byrd was noted for her comprehensive grasp of ideas and inflexible moral standards.

After graduation came four years of high school work, three of them as high school principal, followed by a year of study at Harvard College Observatory under Dr. Edward C. Pickering. From 1883 to 1887 Miss Byrd taught mathematics and astronomy at Carleton College, and under the supervision of Professor W. W. Payne sent out time signals twice daily over ten thousand miles of railway. She received the degree of Doctor of Philosophy from Carleton College in 1904.

She left Carleton College in 1887 to accept the directorship of the new observatory then recently built at Smith College. Here, for nineteen years she taught and worked. Her great contribution to college teaching lay in working out a method for teaching general astronomy as a laboratory science. She believed in taking her students out of doors and in leading them to see and to interpret for themselves what was spread out before them there. For this a textbook was needed, and in 1899 she published her "Laboratory Manual in Astronomy," followed in 1913 by "First Observations in Astronomy," both by Ginn and Co. Few teachers have held their students more rigorously to accurate thinking and scientific method.

Her own technical work in astronomy included mounting, testing, and

adjusting instruments and the definitive determination of the latitude and longitude of the Observatory, this latter requiring a "longitude campaign" with the Harvard College Observatory. The results are published in volume XXIX of the "Annals of Harvard College Observatory." Her special research interest lay in fixing positions of comets by micrometer measures of their distance from known stars, and few comets bright enough to be visible in the 11-inch equatorial telescope at Smith College escaped her. Reports of these investigations were published either in the *Astronomical Journal* of Cambridge, or in the *Astronomische Nachrichten* of Kiel, Germany. She was a member of the American Astronomical Society, the Astronomical Society of the Pacific, and the British Astronomical Association.

At the height of her usefulness to the college she resigned. The blood of martyrs was in her veins and she had to make what protest she could against what seemed to her an ominous tendency in higher education. In accepting large sums from the various educational foundations she felt that colleges and universities limited in a measure their freedom of expression on economic problems. In tendering her resignation to the Board of Trustees she stated clearly the conflict in her own mind, her own questionings as to the methods by which certain large personal fortunes were built up, and her own need for protest, even at sacrifice of her position, against such sources for college funds. Few felt as she did, but all who knew her respected the spirit in which her resignation was offered.

As one friend has written recently: "The world has gone farther than ever on the road Miss Byrd would not travel. How mild and simple it seems to look back on it—life then—but I suppose the foundations were being laid for our toppling structure." And another has written: "She was one in thousands. I think that if more of the people of our country could have seen as she did this wretched depression would have been avoided." And a colleague, years ago, asked: "Why has Mary Byrd a right to a better conscience than the rest of us?"

Perhaps the answer to this last question lies in all her ancestry and inherited traditions as well as in the early environment in "Bloody" Kansas. Her father was great-great grandson of Reverend Timothy Edwards, father of that Edwards who, when driven for righteousness' sake into the wilderness from the church at Northampton where he had preached twenty-four years, wrote "The Freedom of the Will." Mr. Byrd's grandfather was a Revolutionary soldier at the battle of the Brandywine. Miss Byrd's mother, before marriage Elizabeth A. Low, was descended from John Endicott, early governor of Massachusetts. She was a granddaughter of the Revolutionary soldier, Eliphalet Perley, and great granddaughter of Asa Perley, a member of the provincial Congress. One of her brothers, David Low, in early days a prominent judge in Kansas, served in Congress one term, but did not seek reelection because he found "politics and ideal honesty incompatible."

Miss Byrd had rare personal qualities. Interest in people and in all

that went on in the world, consideration for those working under her, generous appreciation of the contributions of others, loyalty as a friend, these were hers in no small measure. It was significant and characteristic of her whole life that even this last summer, after two years of illness from cerebral hemorrhage, she found her greatest pleasure in listening four times daily through a little bedside radio to the news events of the day.

But to those of us who knew her intimately, Miss Byrd's outstanding characteristic was an imagination almost terrible in its vividness and driving power. A hungry child in famine-stricken China was as real—and as hungry—to her as one at her own door. Injustice to an alien people was as bitter as to herself—and she was one of the leaders in organizing the Anti-Imperialist League of Northampton. She wrote me in 1920: "You see my imagination is still in working order. It has helped in most things I have done or tried to do, but sometimes I would gladly shut out its terrible pictures. No other friend as I remember has ever thought or spoken of this, perhaps, unfortunate fairy gift."

And so, with that keen eye of her mind, she saw education fettered, and, to make the protest she knew to be feeble at best, she gave up her livelihood and went back to the Kansas farm. She had no choice but to follow her individual conscience.

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# Dramatization of the Solar System

By E. A. BEITO

The chief movements of the planets and the moon with reference to the sun and the zodiac can be clearly shown by an out-of-door demonstration as here described.

The heliocentric longitudes of the planets for the first of each month of the year are looked up in the *American Ephemeris* and a table for convenient reference is made. A transit instrument, or any other instrument for measuring angles (Figure 1 mounted on plane table may be used for 1934), is placed at the center of a space suitable for the demonstration. The point is considered as the position of the sun and a stake is placed near the edge of the space to represent the position of the vernal equinox, where the heliocentric longitude is zero. Circles representing the orbits of the planets are markd out to scale, by the use of lime, and stakes are placed at the positions of the planets on the first of each month for the year and marked with the date. The positions of the constellations in the zodiac are represented by placards bearing their names and placed outside the orbit of Neptune.

The scheme is shown in Figure 1. The scale in the figure is only approximate. The positions of the planets for the first of each month are marked by a line crossing the orbit; for planets making more than one

circuit in a year the positions for the first circuit are marked as before but the second circuit is marked with a short line outside the orbit, the third circuit with a line inside the orbit, and the fourth with a cross. The small circles represent the positions of the planets on March 1, 1934.

In carrying out the demonstration, ten members of the group dress to represent the various planets, moon, and sun, and take their places for January first while the balance of the group stay near "the earth." The

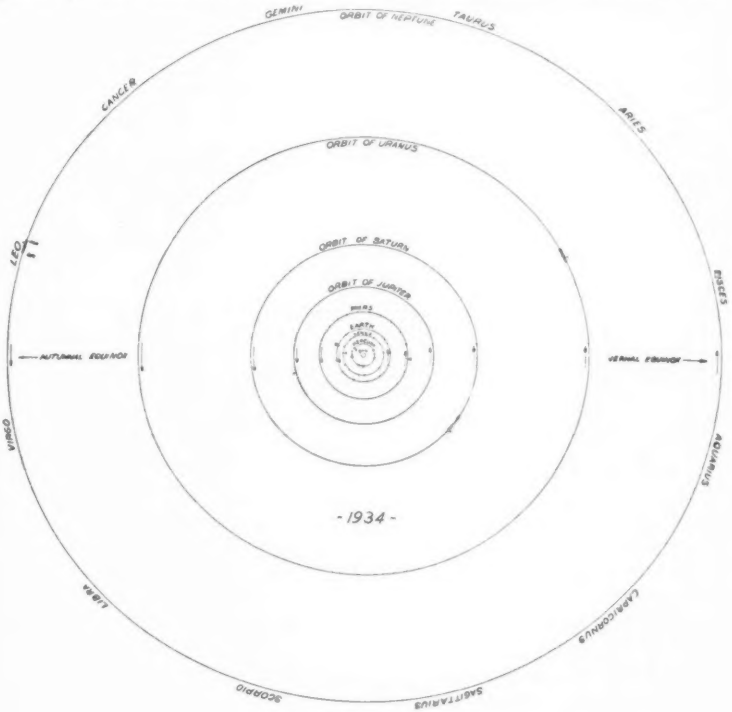


FIGURE 1.

person representing the earth should face away from the sun for in that position he will see the planets and the constellations in the zodiac visible at midnight; if he turns to the right he will see them as they appear in the evening, and if he turns to the left he will see them as they appear in the morning. It is therefore possible to discuss the aspect of the planets and the zodiacal constellations at any given time of the night. The "planets" then travel to their positions for February first, March first, etc.

A brief discussion for March first 1934 (see Figure), for example,

would be as follows: Mercury is in the constellation Aquarius and sets a short time after the sun; Venus is a morning star and rises an hour or two before sunrise; Mars is probably too near the sun to be visible either in the evening or morning; Jupiter is in Virgo, and rises early in the evening and is above the horizon until morning when it fades out of sight; Saturn is in the morning sky near the sun; Neptune is in Leo and is above the horizon most of the night; the sun is in Aquarius moving eastward and will reach the vernal equinox March 21; Mercury will soon be a morning star because its angular speed eastward is faster than that of the earth; both Mercury and Venus are relatively near the earth; Mars is almost at its greatest distance from the earth; etc. As the demonstration progresses, the meaning of elongation, quadrature, opposition, inferior conjunction, superior conjunction, retrograde motion, etc., may be shown.

The movements of the moon can be shown by placing stakes along the orbit of the earth representing approximately the heliocentric longitudes of the moon at each new moon. The dates of new moon for 1934 are recorded in Table I and may be found for other years from the

TABLE I.

DATES OF THE NEW MOON.

| | | | |
|---|---|---|---|
| Jan. 15 | April 13 | July 11 | Oct. 8 |
| Feb. 14 | May 13 | Aug. 10 | Nov. 7 |
| March 15 | June 12 | Sept. 9 | Dec. 6 |

*American Ephemeris* or from a calendar. Beginning at a position of new moon when the moon is between the earth and the sun, the person representing the moon goes forward more slowly than the earth and outward for the first quarter of its period until he is about in the orbit of the earth; during the second quarter he travels forward faster than the earth and outward so that at the end of that quarter he is on the side of the earth away from the sun, which represents the moon's position at full moon; during the third quarter he travels forward faster than the earth and toward the sun so that at the end of the quarter he is ahead of the earth and approximately in its orbit; during the last quarter the moon travels forward slower than the earth and toward the sun until the position of new moon is reached. The moon should at all times keep about the same distance from the earth. It will be seen that the motion of the moon is always eastward and concave toward the sun, but still in a mathematical sense it travels around the earth.

Although the demonstration is far from being rigorous, the writer has found it very helpful to students in their study of the movements of the planets and the moon.

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# Excavated Meteorites

By WILLARD J. FISHER*

The following will attempt to relate meteorite finds to recent geological time.

The distinction between *finds* and *falls* of meteorites, while not rigorous, is nevertheless of considerable importance. That it is not rigorous is illustrated by the Weston fall of 1807, when certain of the stones were observed to fall and throw up the soil, while others were rather accidentally found after the news of the observed falls had penetrated the neighborhood. The Treysa fall is counted as an observed case, though the hole in which the iron lay was not made known for months after the detonating fireball was observed. On the contrary, in Prior's Catalogue (end of 1922) the Saline Township meteorite fall is not admitted as certainly observed, though observation of a fireball and computations based on this led the computer to search for the object. The totals (July, 1927) are: falls, 505; finds, 474; recognized total, 979.

The importance of the distinction (which Farrington does not admit) is that in the case of observed falls we have some knowledge of the relation of the stones to the rest of the universe. The time of the fall connects its orbit with the position of the earth in its orbit, and limits the radiant of the trajectory to a celestial hemisphere. And every additional fact limits the range of location of the orbit, until as at the Pultusk, it may be concluded with considerable certainty whether or not the object was a member of the solar system.

A distinction of less importance may be drawn among mere finds, the history of which begins when they meet the eye of some prospector or farmer. Most of these meteorites have been found on or in the top soil; but some have been found by deeper excavation. (We here exclude such meteorites as those of Odessa, Haviland, and Henbury, found when reasonable suspicions led to searches.) In Farrington's *Meteorites of North America* forty-two meteorites are described as having been found in plowing or other surface agricultural work; and in other works a very incomplete search adds seventeen to the list (including Okechobee, which was brought up from lake bottom in a fisherman's net). The great iron meteorites have been found on the surface, like those of Cape York, or partially projecting from it, like Hoba West and many of the Bethany irons. (Many of the Bethany irons were found also by deliberate search.) There are, then, top-soil and subsoil meteorites.

Of the subsoil class, found accidentally during deeper excavations, search of the Catalogues of Buchner (1863), Farrington (1909), and Prior (1922 and July, 1927) yields twenty-seven cases, of which fair

*Deceased (September 2, 1934).

examples (from Farrington) are the following:*

Bald Eagle, found by workmen . . . it was covered with a fungous growth, as were the stones under which it was buried to the depth of several feet.

Grand Rapids, discovered . . . while making an excavation for building purposes . . . It was found about 3 feet below the natural level of the ground and wedged between two large boulders, and was removed with considerable difficulty.

Hayden Creek, found . . . in the bottom of a 12-foot shaft . . . while prospecting for placer gold.

Kenton County, found . . . while cleaning out a spring . . . It was buried 3 or 4 feet below the normal surface of the ground and interlocked in the roots of an ash tree.

The deepest finds were Haniet-el-Beguel, S. Algeria, about 5 meters, found while digging a well; Lujan, about 6 meters, purpose of excavation not known, but over it were the remains of a megatherium; Obernkirchen, 15 feet, in a sand layer, found while clearing away in a quarry; Petropawlovsk, 31½ feet, in gold-bearing alluvium; Ollague, 10 to 14 feet, purpose of excavation not stated.

All of these subsoil finds were in loose material or clay. No recorded meteorite has ever been quarried or mined from rock, either in ore or coal. This may seem remarkable, yet breaker boys in the anthracite mines of Pennsylvania, not fools nor yet altogether wise, might be expected, in spite of the haste of their work, to notice such a remarkable object as a piece of iron. Iron might also damage crushing machinery. Lumps of limonite, whatever their original condition, could readily pass without exciting interest, and be thrown out with the slate. Probably no iron meteorite has survived to pass as such through rock or coal crushers.

Modern operations with steam shovels might naturally be expected to lead to few or no discoveries of meteorites even in subsoil material.

Of the subsoil meteorites, twenty-three were iron or stony iron, and four were stones. The ratio accords with the overwhelming proportion of irons to stones in *finds* of meteorites, and contrasts with the overwhelming proportions of stones to irons in *falls* of meteorites.

A few conclusions may be drawn:

In the unconsolidated materials above the underlying rock, there must be vast numbers of meteorites. In general, their location cannot be predicted.

The preponderance of iron finds is probably due to the impressive heaviness of iron objects. Perhaps also the iron lasts better (if free from ferrous chloride); but not long enough to be fossilized as such. On the surface, small iron objects go to limonite. The Estherville stony-

*Hopewell Mounds, and similar examples are not counted; for while this meteorite was found in archeological excavation, the position in an artificial mound along with ornaments, etc., shows that its presence also was artificial, and not due to penetration after fall.

iron fall area was revisited fifty years after the fall and there were found numerous nodules of limonite, foreign to the region, but no iron.

The age of the subsoil meteorites may be estimated at thousands of years, for they seem to lie below the depths to which their striking velocities would carry them,* and have therefore been covered in part by deposits after falling.

Another evidence of the great average age of even top-soil meteorites is found in their geographical distribution in North America. In his book, *Our Stone-Pelted Planet,* Professor H. H. Nininger has published a large number of distribution maps of iron and stone meteorites. One of these, p. 149, displays the distribution of iron meteorites in North America. Most of these are finds, the proportion of iron falls being so small as not to affect the distribution. These irons are concentrated in two regions, the Appalachian region of the states south of the Ohio River, and the upland from southern Colorado southward. North of the Ohio and the Missouri Rivers iron meteorites are remarkably sparsely distributed, the line of these streams forming a quite obvious boundary between sparseness and richness. The concentration in uplands and mountains is explainable as due to the general hardness of the ground, though such a concentration fails in New England and Canada, where also the surface is largely hard. The sparseness in the southern states of the Mississippi Valley is explainable by the general softness of the ground, which would permit even moderate-sized meteorites to penetrate below the reach of the plow. But that the limit between general sparseness and general density of distribution of iron meteorites should be the river line mentioned seems inexplicable till one notes that the line of the Ohio and Missouri Rivers coincides quite closely with the southern limit of glacial drift. In other words, south of the limit of glacial drift iron meteorites are numerous; north of it they are few. We may conclude, subject to further evidence, that the iron meteorites of southern North America are *largely pre-glacial,* while those north of the drift line fell since the ice ceased to remove loose material from the sound rock surface of the glaciated area. The pre-glacial and glacial meteorites of the area north of the drift line are buried and hidden in the helter-skelter moraine and outwash deposits left by the retreating ice. (Kokomo, above, is well within the limit of glaciation.)

In other words, the iron meteorites of North America fell mostly thousands of years ago, and our collections are the gleanings of many millenia.

Erratum Note on *Harvard Reprint* No. 87, The penetration of iron meteorites into the ground.

In the paper, The penetration of iron meteorites into the ground, it was stated that "the penetration of *drei Klafter,* or three fathoms, of the Hraschina iron, is incredible."

*On this, see W. J. Fisher, *Proc. Natl. Acad. Sci.,* **19**, pp. 286-291, 1933: The penetration of iron meteorites into the ground. Also *Harvard Reprint* No. 87.

Further search has shown that the translation of the original records from Latin into German was in error, and that *drei Fuss*, three feet, is the correct translation.

On the curve sheet of the paper, the deduction of log 6 from the ordinate corresponding to mass 39.8 kg brings the Hraschina point down into the band of points, and leaves only the point for Hassi Jekna discordant.

# Frank Evans Seagrave

By CHARLES H. SMILEY

Frank Evans Seagrave was born in Providence, Rhode Island, March 29, 1860, the son of George Augustus and Mary Greene (Evans) Seagrave. His father was a wealthy man, the owner of a textile mill and the president of a bank in Providence. His family was one of the oldest in New England, having settled there before the Revolutionary War. He attended a private school conducted by Rev. Charles H. Wheeler. At the age of fourteen, he saw a lunar eclipse which aroused his interest in astronomy. He persuaded his father to purchase for him a 3-inch telescope; this telescope he used on almost every clear evening. A year later, his father gave him a refracting telescope of eight and one-half inches aperture made by Alvan Clark.

The years 1875 to 1877, he spent at the Harvard College Observatory. Through the kindness of the director, he was allowed access to the instruments and to the library though he was not registered as a student at Harvard. In 1878, he returned to his father's home on Benefit Street, Providence, and erected there an astronomical observatory in which he mounted his Clark telescope. For some time after his own observatory was completed, he continued to go to the Harvard College Observatory twice a week to observe.

His interest in astronomy was now the predominant influence in his life, and he was beginning to be known for his work in this field. When he was only sixteen years old, he was invited to be a member of an expedition to Fort Worth, Texas, to observe the total solar eclipse visible there in 1878. This invitation he was glad to accept, and by good fortune, the twenty-ninth of July was clear. This, his first total solar eclipse, he observed under very favorable conditions.

On December 6, 1882, he photographed the transit of Venus from his observatory in Providence. For some time after this, he interested himself in double stars and made many measurements of them. In 1887, he went on another eclipse expedition, this time to Potsdam, Germany. Partly cloudy skies prevented him from having a perfect view of this total solar eclipse. He was more fortunate in 1900 when he travelled to Southern Pines, North Carolina, to observe the total solar eclipse of that year. The skies were perfectly clear on May 28, and he had an excellent view of the eclipse.

Later he became very much interested in the mathematical computation of orbits and eclipses. He competed for the Astronomische Gesell-

schaft Prize for the best essay on Halley's Comet in 1910. Though he did not win the prize, he is credited with having done an excellent piece of work. For this, he was awarded an honorary degree of Master of Arts by Brown University on June 22, 1911. On this occasion, President Faunce of Brown University made the following citation: "Citizen of Providence and watcher of the skies, who, without academic position, has, by mathematical research, commanded the attention of teachers and astronomers at home and abroad."

In 1912, he was appointed to serve at the Harvard College Observatory, filling the post previously held by Oliver C. Wendell. His duties included the observation of the minima of variable stars. He did not continue at this post long, returning to Providence in 1914. At this time, he removed his own observatory from the city to a knoll in the country near North Scituate, Rhode Island. Here he erected a new building with a cylindrical wooden dome, revolving on cannon balls and supported by a substantial brick wall thirty feet high. Before he mounted his telescope in its new location, he had it overhauled by Alvan Clark and Sons. This new observatory he used regularly until his death.

In 1925, Mr. Seagrave observed his fourth total solar eclipse from his own observatory. Though the day was very cold and clouds threatened in the early morning, the skies cleared and he was able to observe the eclipse. He was not so fortunate in 1932, for the skies were cloudy at Whitefield, New Hampshire, on the day of the eclipse, August 31.

He had hoped to observe the Perseids again in 1934 as he had followed them for many years. Illness prevented this, and death came on August 15, 1934.

Astronomers will probably remember him best for the many orbits and ephemerides of comets and asteroids he published in his lifetime. He was also an assiduous observer; he did not limit himself to any one field, but observed whatever was available at the moment. Double stars, meteors, aurorae, occultations of stars and planets by the moon, variable stars, sun-spots, Saturn's ring system, solar eclipses—all were familiar to him. Cloudy weather he disliked intensely because it kept him from observing. Even so, he was very generous in allowing visitors to come to his observatory and he answered their questions with great patience.

He was a tall, dignified gentleman with snow-white hair in his later years. His keen sense of humor and the kindly twinkle in his eyes endeared him to his many friends. His stories of the great astronomers of the last half-century, many of whom he had known personally, were always interesting, and his enthusiasm for his work was very contagious. Save for the short time he spent at Harvard in 1912, he remained an amateur astronomer; an amateur in the finest meaning of the word. He did his work in astronomy, not for monetary rewards but for the love of it, and the papers he published in astronomy, about one hundred and fifty in all, give not the slightest hint of the enormous amounts of time and energy necessary for their creation.

Brown University, September, 1934.

# Planet Notes for December, 1934

By CLIFFORD E. SMITH

The *Sun* will be moving with an apparent southeasterly motion until December 22 at $6^h\ 50^m$ A.M., C.S.T., at which time it will be at the winter solstice; thereafter its apparent motion will be northeasterly. The instant when the sun is at the winter solstice marks, officially, the beginning of winter in the northern hemisphere, and the beginning of summer in the southern hemisphere. On the first day of the month the distance from the earth to the sun will be about 91.6 million miles. By the last day of the month this distance will have decreased about a quarter of a million miles. The sun will move across the southern part of the constellation Ophiuchus over into the central part of the constellation Sagittarius. Its position on the first and last days of the month will be, respectively:

R.A. $16^h\ 25^m$, Decl. —21° 40′; and R.A. $18^h\ 38^m$, Decl. —23° 10′.

The phenomena of the *Moon* will occur as follows:

| | | | | |
|---|---|---|---|---|
| New Moon | Dec. | 6 | at 11 A.M. | C.S.T. |
| First Quarter | | 13 | " 5 A.M. | " |
| Full Moon | | 20 | " 3 P.M. | " |
| Last Quarter | | 28 | " 8 P.M. | " |
| Perigee | | 9 | " 2 A.M. | " |
| Apogee | | 25 | " 4 A.M. | " |

*Mercury* will be moving with an apparent easterly motion from the central part of the constellation Libra, across Scorpio and Sagittarius, to the central part of Ophiuchus. On the first of the month it will rise about an hour before the sun, and its apparent position on that date will be R.A. $15^h\ 20^m$, Decl. —15° 56′. At the end of the month it will be only a degree or so from the sun. Superior conjunction will occur on December 30 at 8:00 P.M., C.S.T. Early in the month the distance from the earth to Mercury will be about 115 million miles. This distance will increase about 20 million miles during the month. The corresponding change in apparent diameter will be from about 5.4 to about 4.6 seconds of arc. Conjunction with the moon will occur on December 5 at 1:00 P.M., C.S.T. (Mercury 5°5 N).

*Venus* will be too near the sun in apparent position to be of interest. At the end of the month, however, it will be seen just at sunset in the evening sky. On the last day of the month it will set about 45 minutes after the sun. The distance from the earth to Venus will be about 150 million miles at the end of the month, and the corresponding apparent diameter will be about 10 seconds of arc.

*Mars* will be a morning object in western Virgo. At the end of the month it will rise about midnight. At that time the distance of Mars from the earth will be about 125 million miles, and its apparent diameter will be about 7 seconds of arc. Mars will be in conjunction with the moon on December 29 at 6:00 P.M., C.S.T. (Mars 7°8 N). The apparent motion of Mars in the sky will be easterly.

*Jupiter* will be moving with an apparent easterly motion in the central part of Libra. During the middle of the month it will rise about three hours before the sun, and, at that time, its distance from the earth will be about 570 million miles and its apparent diameter will be about 30 seconds of arc. Conjunction with the moon will occur on December 4 at 7:00 A.M., C.S.T. (Jupiter 6°3 N).

*Saturn* will be moving with an apparent easterly motion in the eastern part of Capricornus. During the middle of the month it will set about 4 hours after the

sun, and, at that time, its distance from the earth will be about 950 million miles and its apparent diameter will be about 14.6 seconds of arc. It will be in conjunction with the moon on December 11 at 8:00 A.M., C.S.T. Its apparent motion in the sky will be easterly.

*Uranus* will be moving with an apparent westerly motion in the extreme southwestern edge of Aries. During the middle of the month it will set about two hours after midnight, and its distance from the earth will be about 1800 million miles. Its apparent diameter will be about 3.6 seconds of arc. Conjunction with the moon will occur on December 16 at 2:00 A.M., C.S.T. (Uranus 6°.1 S). Its position on December 17 will be R.A. $1^h\ 44^m$, Decl. +10° 8′.

*Neptune* will be a morning object in southern Leo a degree or so southeast of χ Leonis. During the first part of the month it will rise about midnight since quadrature west of the sun will occur on December 7 at 2:00 A.M., C.S.T. Its distance from the earth will be about 2800 million miles, and its apparent diameter will be about 2.4 seconds of arc. Conjunction with the moon will occur on December 27 at 4:00 A.M., C.S.T. (Neptune 5°.1 N). The position of Neptune on December 17 will be R.A. $11^h\ 5^m$, Decl. +6° 56′.

## OCCULTATION PREDICTIONS

(Taken from the *American Ephemeris.*)

The quantities in the columns *a* and *b* are given for the purpose of making these predictions useful for any place within 200 miles of the point indicated. The procedure is as follows: Subtract the longitude of the point given from the lnogitude of the place in question; multiply the result, taking the signs into account, by the quantity under *a* for the star to be observed; similarly, with the latitude, using *b*; apply the sum of the products, with its proper sign, to the Greenwich C.T., and obtain the predicted Greenwich Civil Time for the phenomenon at the place of observation. To obtain Eastern Standard Time it is necessary to subtract five hours; Central Standarrd Time, six hours, etc.

OCCULTATIONS VISIBLE IN LONGITUDE +72° 30′, LATITUDE +42° 30′.

| Date 1934 | | Star | Mag. | IMMERSION Greenwich C.T. | *a* | *b* | Angle E from N | EMERSION Greenwich C.T. | *a* | *b* | Angle E from N |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | h m | m | m | ° | h m | m | m | ° |
| Dec. | 2 | 370 B.Vir | 6.0 | 9 30.5 | −0.7 | 0.0 | 128 | 10 42.1 | −1.1 | 0.0 | 301 |
| | 11 | 29 Cap | 5.5 | 0 38.8 | −0.8 | −1.2 | 88 | 1 31.5 | +0.1 | +0.4 | 212 |
| | 15 | 136 B.Psc | 6.5 | 0 20.8 | −1.3 | +1.4 | 44 | 1 37.4 | −1.6 | +0.2 | 246 |
| | 17 | 26 Ari | 6.2 | 3 55.0 | −1.6 | −1.2 | 94 | 5 6.4 | −1.2 | +0.3 | 231 |
| | 19 | χ Tau | 5.3 | 4 32.0 | −1.9 | +0.3 | 72 | 5 52.2 | −1.5 | −1.6 | 280 |
| | 24 | $o^2$ Cnc | 5.7 | 11 8.5 | −0.8 | −1.7 | 111 | 12 15.1 | −0.2 | −2.1 | 309 |
| | 24 | $o^1$ Cnc | 5.1 | 11 36.4 | .. | .. | 185 | 12 4.1 | .. | .. | 236 |
| | 26 | 43 Leo | 6.3 | 8 0.0 | −1.6 | −1.0 | 126 | 9 26.0 | −1.5 | −1.6 | 310 |
| | 29 | *q* Vir | 5.3 | 7 51.7 | −1.1 | +0.4 | 116 | 9 6.4 | −1.0 | −0.6 | 317 |
| OCCULTATIONS VISIBLE IN LONGITUDE +91° 0′, LATITUDE +40° 0′. | | | | | | | | | | | |
| Dec. | 2 | 370 B.Vir | 6.0 | 9 26.9 | +0.1 | −1.1 | 158 | 10 18.6 | −1.0 | +1.5 | 265 |
| | 11 | 29 Cap | 5.5 | 0 21.6 | −1.1 | −0.2 | 67 | 1 27.1 | −0.5 | +0.1 | 228 |
| | 14 | 136 B.Psc | 6.5 | 23 57.5 | −0.5 | +2.7 | 16 | 1 0.3 | −2.4 | +0.1 | 270 |
| | 17 | 26 Ari | 6.2 | 3 19.4 | −2.2 | −0.2 | 89 | 4 37.6 | −1.6 | +1.3 | 224 |
| | 19 | χ Tau | 5.3 | 3 52.8 | −2.0 | +1.1 | 74 | 5 21.0 | −2.2 | −0.2 | 266 |
| | 24 | $o^2$ Cnc | 5.7 | 10 58.2 | −0.8 | −2.4 | 144 | 12 9.1 | −1.2 | −1.7 | 282 |
| | 26 | 43 Leo | 6.3 | 7 40.4 | −0.9 | −2.1 | 160 | 8 50.2 | −2.4 | +0.7 | 269 |
| | 27 | $p^5$ Leo | 5.3 | 14 1.3 | −1.0 | −1.9 | 123 | 15 13.7 | −0.6 | −2.1 | 303 |
| | 29 | *q* Vir | 5.3 | 7 41.3 | −0.2 | −0.6 | 146 | 8 44.8 | −1.1 | +0.8 | 280 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Occultations Visible in Longitude +120° 0′, Latitude +36° 0′. | | | | | | | | | | | |
| Dec. | 10 | 29 Cap | 5.5 | 23 | 44.0 | −1.0 | +1.7 | 24 | 0 | 50.2 | −2.4 | −0.4 | 269 |
| | 13 | 22 Psc | 5.8 | 23 | 4.9 | −1.4 | +1.5 | 80 | 0 | 8.7 | −0.8 | +2.3 | 207 |
| | 16 | 101 Psc | 6.2 | 0 | 59.7 | .. | .. | 125 | 1 | 24.3 | .. | .. | 166 |
| | 17 | 26 Ari | 6.2 | 2 | 22.5 | −1.1 | +2.1 | 54 | 3 | 41.1 | −1.7 | +1.4 | 246 |
| | 19 | χ Tau | 5.3 | 3 | 7.6 | −0.5 | +2.5 | 46 | 4 | 16.5 | −1.9 | +0.5 | 278 |
| | 22 | 58 Gem | 6.0 | 12 | 42.3 | −1.7 | −0.5 | 72 | 13 | 34.0 | +0.4 | −2.9 | 336 |
| | 27 | $p^6$ Leo | 5.3 | 13 | 45.6 | +0.2 | −3.6 | 182 | 14 | 38.5 | −3.2 | −0.5 | 259 |

## Comet Notes

By G. VAN BIESBROECK

The absence of known or expected comets continues. Periodic Comet Encke will perhaps become visible for southern observers by the end of October. Towards the end of the year it will come in reach on this side of the equator but the brightness will be greatly reduced.

In spite of its extreme faintness Periodic Comet Wolf I has again been recorded by Jeffers at the Lick Observatory on September 7 and 14. The magnitude was carefully determined as $19^M.1$ on the international scale.

Williams Bay, Wisconsin, October 22, 1934.

## Meteor Notes from the American Meteor Society

By CHARLES P. OLIVIER, President

Following the great shower of Draconids over Europe on 1933 October 9, a number of articles have appeared in foreign journals dealing with this brilliant phenomenon. It so happened that for the first time in history photographic plates were sensitive enough to register a fair number of trails in such a shower, and trails were actually recorded at several places.

An article dealing with results secured at the Royal Observatory of Brussels, at Uccle, Belgium, written by Professor S. Arend and Professor J. Hunaerts of its staff, seems of special interest. It is entitled "Note concernant l'averse d'étoiles filantes du 9 octobre 1933," and appeared in *Bulletin de la Classe des Sciences*, 5e Série, XX - 1934 - 6, of the Académie royale de Belgique. As there is little chance that our observers will see this journal, a review seems fully justified.

The two plates on which the article is based were taken with a new astrographic Zeiss doublet with lenses of 40 cm aperture and 2 meters focal length. Twelve meteor trails may be seen upon the two plates with the unaided eye, about three times as many with a magnifying glass. One plate was exposed from $18^h\,52^m$ to $19^h\,27^m$ and the other from $19^h\,34^m$ to $20^h\,09^m$, U.T., their centers being at (1933) $\alpha = 22^h\,41^m.1$, $\delta = -1°\,05'$ and $\alpha = 22^h\,07^m.0$, $\delta = -4°\,36'$, and hence about 65° from the visually determined radiant. The trails therefore have the advantage of being in general long, but the great disadvantage of having small angles between them, which makes the determination of the radiant difficult. It should be noted that the plates were taken for asteroids, not meteors. Had they been planned for meteor records, the radiant would doubtless have been placed near the edge of the plates.

The procedure in investigating the trails was to measure two points on each trail, the positions being derived by the method of dependences from two or three reference stars. For eight trails which appared on one plate, their lengths rang-

ing from 6 to 16 cm, the two points on each had their coördinates x, y, and z determined, where as usual $x = \cos\delta\cos\alpha$, $y = \cos\delta\sin\alpha$, $z = \sin\delta$. Eight equations of great circles were found, of the form $ax + by + cz = 0$; normal equations were then derived; and finally the most probable radiant was calculated as $\alpha = 266°.50$, $\delta = +54°.87$ (1900).

The distance each trail on projection passed from this point is of great interest as it shows the possible accuracy of such a determination of a radiant. The computed distances were +0°.14, 0°.00, —0°.08, +0°.03, —0°.04, +0°.10, +0°.03, —0°.24, a most satisfactory result. However, had the points of intersection of the circles, taken in pairs, been sought as a measure of accuracy, such points would have been farther from the adopted radiant. For instance, trails number 1 and 6, the most brilliant of all, made an angle of 4°.7 with one another, and gave a radiant of $\alpha = 265°.68$, $\delta = +54°.95$ (1900), which is 0°.82 from the radiant given above.

As an opinion of the reviewer, it may be said that one would not expect these eight meteors to come from a point radiant in any case. The slightest lack of parallelism in their orbits, irregular shapes of the particles themselves (causing deviations in their atmospheric paths), the slight differences in zenith attraction even in the 35 minutes of exposure of the plate, and probably other causes would all tend to give a radiant area, not point. We should hence fully expect the intersection of any given pair to differ from the center of the radiant area. The small differences shown are but a proof of the high accuracy obtainable by such methods.

The authors next calculated a parabolic orbit by semi-graphical methods, obtaining

$$\begin{aligned} \Omega &= 196°0 \\ i &= 35°1 \\ \omega &= 173°9 \\ \log q &= 9.999 \end{aligned}$$

These elements strongly resembling those of Comet Giacobini-Zinner, the usual and reasonable assumption was made that the major axis of the meteor stream was equal in length to that of the comet's orbit. With this assumption it is possible to calculate the velocity of the meteors in space, and from this to compute the corrections for zenith attraction and diurnal aberration. With these two corrections introduced, the position of the radiant became $\alpha = 262°.29$, $\delta = +53°.87$. An elliptic orbit was based upon this position, and gave elements as follows:

| Meteor Stream | | Comet Giacobini-Zinner* | |
|---|---|---|---|
| $\omega$ = 172°.01 | 1933 | $\omega$ = 171° 44′ | 1926 |
| $\Omega$ = 195°.05 | | $\Omega$ = 195° 57′ | |
| $i$ = 30°.73 | | $i$ = 30° 43′ | |
| $\log q$ = 0.9941 | | $\log q$ = 0.9931 | |
| $e$ = 0.7176 | | P = 6.5832 | |

A glance at the two sets of elements leaves no doubt as to the certainty of the connection between the meteor stream and the comet.

The last part of the paper is taken up with a discussion of the visually observed rates of these meteors. They were found to fit one of Charlier's theoretical curves of frequency very well. The writers calculated that the earth traveled 540,000 km while passing through the stream; multiplying this by sin $i$ gives 270,000 km as the approximate width of the meteoric tube where we crossed it. Applying some formulae of Schiaparelli, they find that the earth cut out of the

**M.N.R.A.S.*, **87**, 296-7, 1926.

meteor stream a cylinder whose diameter and length were respectively 14,500 km and 360,000 km. The paper ends with a general discussion as to how the actual density of such a stream might be computed from data on the diameter and length of the section traversed.

This is not the place to do more than call attention to the fact that the paper also gives derivations of formulae for the calculation of meteor orbits, as well as formulae, with necessary explanations, to be applied to the measures of the trails upon the plates. The latter are of more importance, as printed reports deal with such plate measurements are more difficult to find than those concerning orbits.

Since it is known that similar photographic results were obtained at one or more other places, it would be of great value if the owners of the other plates would make a similar study of the radiant point. Never before has an opportunity offered itself for the comparison of such numerous photographic results on a meteor shower. The fullest and most complete study should be made of them.

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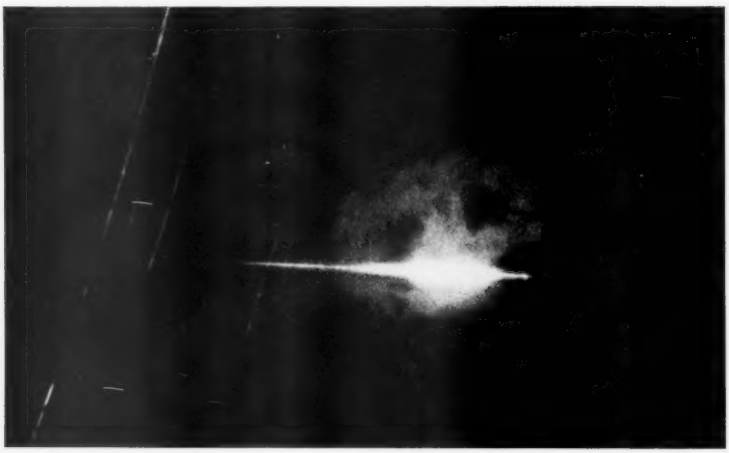
Professor J. J. Sykora, of Ondrejov, Czechoslovakia, had the good fortune on August 11 to secure a unique photograph of a fireball. A reproduction of this appears herewith, thanks to the kindness of Professor Sykora, who sent me several excellent prints. The fireball appeared at $23^h\,45^m\,20^s$ U.T., and was photo-



graphed by twin cameras. The following description (abbreviated) was given by Dr. Guth:

> ". . . the meteor began as one of the 1st magnitude, but soon its light augmented enormously and . . . illuminated the country. We estimated its magnitude at —5; its green color changed from green to blue-green and extinguished itself slowly. But after the passage which took from 1½ to 2 seconds, a brilliant train remained . . . first blue, then yellow, bordered with red; this train suddenly bent in its second half and slowly extinguished. But curiously at the very place of the train several small luminous clouds, about 4, formed from the rest of the shining matter, having about the luminosity of the cluster $h\chi$ Persei, clouds which moved in the direction of the meteor, and which one could observe for about five minutes. Next a veil of high clouds covered the whole phenomenon."

A simultaneous observation at Prague, combined with data from these photographs, gave the beginning and ending heights as 72 and 47 km respectively, while the luminous clouds were only 50 to 60 km above the ground. This train height is somewhat surprising, for study of long-enduring trains previously indicated that they were restricted to the 75-100 km zone. It also emphasizes the importance, so often insisted upon by me, of expending every effort in getting more data on long-enduring meteor trains, of which as yet we know far too little.

The observers in Czechoslovakia have also previously had remarkable success in photographing meteors. This may be righthly considered a subject for most sincere congratulation of Professor Sykora.

Flower Observatory of the University of Pennsylvania,
Upper Darby, Pennsylvania, 1934 October 6.

# Notes from the Society for Research on Meteorites

*Edited by* FREDERICK C. LEONARD, President, and H. H. NININGER, Secretary

## Two New Meteoritic Irons from New Mexico: The Grant Meteorite and the Santa Fe Meteorite*

*By* EDWARD P. HENDERSON,
Assistant Curator of Physical Geology, U. S. National Museum

Within the past three years the National Museum has acquired through the Roebling Fund two iron meteorites from New Mexico. Comparison with other falls and finds from the neighboring regions fails to establish their identity with any of the known meteorites, and the following notes have been prepared in order to place them on record.

### 1. THE GRANT METEORITE

The Grant meteorite was first brought to the attention of the United States National Museum in January, 1929, by Mr. Harold E. Elliott of Fort Sumner, New Mexico. Mr. Elliott acted as agent for the owners, Mr. Charles E. Herring and a Mexican whose name was not given. Neither the date of fall nor that of discovery is known, but the specimen was found apparently only a short time before it was offered for sale. Mr. Herring advises that the meteorite was unearthed in the Zuni Mountains, about 45 miles south of Grant, Valencia County, New Mexico, for which place it is named. According to his description, the meteorite was embedded about two feet under the top soil, two feet being the approximate thickness of the soil at this point.

The meteorite is a rather symmetrically shaped conical mass of iron weighing 1060 pounds. It is 21¼ inches from the lowest point on its naturally shaped base to the apex, and the base measures 29⅜ inches in one direction and 22⅛ inches on a right-angle cross-line. The iron is only slightly altered, and in many places the bright metal shows through the thin film of rust. The surface is smoothly rounded, but near the base on one side is an area about 17 inches long and 5 inches in its widest part, which has a ragged surface, appearing to be a recent break.

A great many circular cavities appear on the surface and these are rather uniform, most of them being between one and two inches in diameter. The bottoms of these crater-like holes are gently rounded and several are between one-

*A paper presented at the Second Annual Meeting of the Society, held at the University of California, Berkeley, on June 18 and 20, 1934.

half and three-fourths of an inch deep. The apex is roughly flattened out into a rather lobed triangular surface, this being in all probability the *Brustseite.*

The polished face after etching, shows a moderately fine octahedral structure. The kamacite bands are slightly swollen in the center, constricting toward the ends. The angular areas between intersecting kamacite bands (plessite) have borders which are concave toward the kamacite. Between the kamacite and the plessite is a thin but persistent rim of tænite. In a number of the plessite areas there are thin parallel bands of tænite of uniform thickness, the apparently enlarged pointed edges being due to the coalescence of two of the tænite bands.

FIGURE 1. THE CONE-SHAPED GRANT METEORITE.
This view shows the ragged surface which represents a recent break.

Two circular masses of troilite are shown on the polished face, the larger having a maximum diameter of 2.3 cm. Immediately surrounding the troilite inclusion, the octahedral structure has to some extent been modified, and the plessite nearest to the troilite shows a concave curvature, which, in almost every case, conforms to the shape of the troilite. The rim of kamacite surrounding the troilite varies between one and two mm. in width.

The rod-like and also the angular inclusions are schreibersite, and these apparently affect the immediately adjoining structure in the same manner as the troilite. The Wallapai meteorite* has numerous angular inclusions of schreibersite, and there is a decided absence of any structure in the iron immediately surrounding these inclusions.

Shortly after the acquisition of the Wallapai iron, a visiting chemist began an analysis of this meteorite under the direction of the late Dr. George P. Merrill,

*Merrill, G. P.: *Proc. U. S. Nat. Mus.*, **72**, §22, pp. 1-4, pls. 1-3, 1927.

who intended to describe it. In the course of this analysis Dr. W. F. Foshag noticed minute velvety black prismatic crystals in the insoluble residue, only one of which had faces sufficiently well developed to be measured. This was found after measuring to be a distorted isometric crystal, an elongated octahedron and a dodecahedron. A few minute velvety black octahedrons were associated with these elongated crystals and it is probable that both are chromite.

From a sample weighing 46.45 grams, sawed from the original mass of the Grant iron, the following analysis was made after the rust had been carefully removed. The entire piece was dissolved in *aqua regia*, and several additional quantities of nitric acid were added to insure complete oxidation of both the sulphur and the phosphorus. At least six such treatments were made, and then the excess acid was evaporated off and the nitric acid expelled by repeated evaporations with concentrated hydrochloric acid. The hydrochloric solution was diluted and the various determinations were made upon aliquot portions.

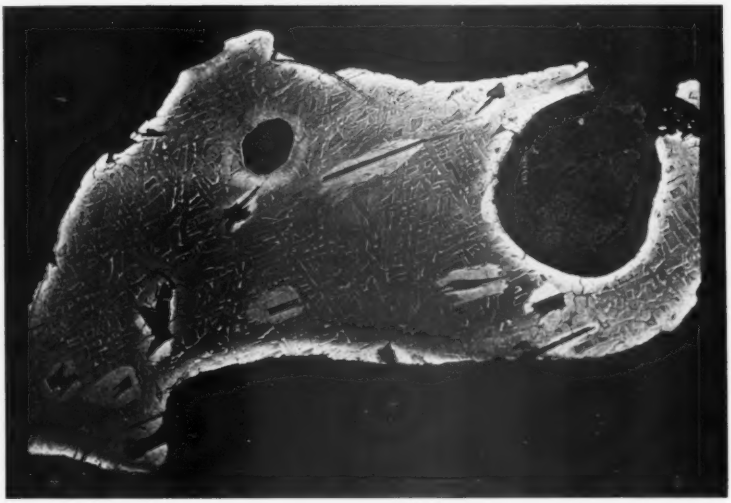


FIGURE 2. AN ETCHED SLICE OF THE GRANT METEORITE.
(The inclusions were protected from etching; hence the "halo" around each inclusion.)

ANALYSIS OF THE GRANT METEORITE
E. P. Henderson, Analyst

| | % |
|---|---|
| Insol.: | 0.046 |
| C: | 0.002 |
| Fe: | 89.45 |
| Ni: | 8.58 |
| Co: | 0.011 |
| P: | 1.15 |
| S: | 0.02 |
| Cu: | trace |
| Pt: | none |
| Total: | 99%.25 |

### 2. The Santa Fe Meteorite

In October, 1930, a fragment of iron was received at the National Museum for determination as to its possible meteoritic nature. It was found to be unquestionably a fragment of a meteorite, and the entire mass was subsequently purchased from Mr. La Rue Paytiamo of Glorieta, New Mexico.

Figure 3. The Santa Fe Meteorite
viewed from two directions at right angles to each other.

According to Mr. Paytiamo, this meteorite was found about 14 miles east of Santa Fe, New Mexico, on the Las Vegas highway. It will therefore be called the Santa Fe meteorite. The discoverer was a Mexican whose name does

Figure 4. An Etched Slice of the Santa Fe Meteorite.

not appear in the records, and we have no information as to the date of either fall or discovery.

The meteorite, which is somewhat club-shaped, weighs 23 pounds, and measures 18¾ inches in its greatest length, 4⅜ inches in maximum width, and 2⅜ inches at right angles to the latter dimension. One end is smaller in every dimension, and the size increases, rather gradually, reaching a maximum near

the opposite end. There are four rather prominent ridges which continue almost the entire length of the meteorite. These ridges occur in such a manner about the long axis of the iron that a cross-section, cut at right angles to the long axis and near the thickest portion, would have a rhombic outline.

The surface is uniformly pitted, but none of the pits is deep, and since the polished section does not show any troilite, it is not likely that these pits are the result of the weathering or burning out of troilite masses. There is only a slight coat of weathered iron on the surface, and the cross section does not show any veinlets of rusty material extending into the iron.

The structure is a fine octahedrite, but a few prominent bands of kamacite are much coarser than others. Between the kamacite and plessite areas there are thin bands of tænite, and some of the kamacite bands are streaked with thin parallel stringers of tænite. There is a total absence of troilite and schreibersite inclusions.

The chemical analysis was made upon a small piece weighing 14.341 grams after it had been polished free from all oxidized matter. This sample was dissolved in mixed nitric and hydrochloric acid and the analysis was made in the usual manner.

ANALYSIS OF THE SANTA FE METEORITE
E. P. Henderson, Analyst

| | % |
|---|---|
| Insol.: | 0.001 |
| Fe: | 94.75 |
| Ni: | 4.64 |
| P: | 0.23 |
| S: | 0.04 |
| Co: | 0.32 |
| Cu: | trace |
| Total: | 99%.981 |

United States National Museum, Washington, D. C.

## A Classification of the Meteoritic Additions to the Earth*

*By* H. H. NININGER

When a meteorite from space encounters the earth's atmosphere it quickly undergoes a change of relationship from a condition in which it was an unattached unit with free individual motion to one in which it is a part of our planet. This paper attempts to deal with the problem of how the material of meteorites is distributed in this new relationship.

It is at once evident that the materials composing a meteorite are widely distributed during the process of its penetration into the earth. Some of the materials are reduced to the finest of powder, and probably a considerable portion is transformed into gases, while yet the invading missile is high up in the thinner atmosphere. Certainly this disintegration begins in some cases as high as a hundred miles above sea level and it apparently continues until the meteorite has approached to within a few miles of the soil, where in most cases it undergoes one or more violent disruptions and scatters its remnants over several square miles.

The distribution of the surviving fragments may be considered both from the standpoint of the area over which they are scattered, and from the standpoint of the depths to which they penetrate. The areal distribution has been the subject of considerable discussion by a number of writers. Farrington, in 1915, sum-

*A paper delivered at the Second Annual Meeting of the Society.

marized the findings in this field in chapter five of his book entitled *Meteorites*. So far as is known to the present writer, no attempt has been made to deal systematically with the penetrative distribution of meteorites. It is to this aspect of the subject that we now propose to give our attention.

It is only fair to state at the beginning of our discussion that in the writer's opinion our knowledge in this field is too meager for any attempt at final conclusions. The present effort is intended as an introduction to the problem. The most that we can hope to accomplish in the present effort is to erect a frame-work upon which later discovered facts may be arranged.

A study of 102 witnessed falls reveals the fact that from these falls 50 individuals were recovered from below plow depth. The average weight of these 50 stones and irons was 84.7 lbs. (38.5 kgs.). The average depth of burial was 22 inches (55 cms.).

Thirty-two of the fifty had weights of less than 50 lbs. (22.7 kgs.), and the average weight for these was 20.3 lbs. (9.2 kgs.). The average depth of burial for these 32 individuals was 20.3 inches (50.8 cms.).

Six individuals weighed between 50 lbs. and 100 lbs. (22.7 kgs. and 45.4 kgs.), with an average weight of 63 lbs. (28.6 kgs.). For these the average depth of burial was 32 inches (80 cms.).

Seven individuals weighed between 100 lbs. and 200 lbs. (45.4 kgs. and 90.8 kgs.), with an average weight of 139 lbs. (63.2 kgs.). For these the average depth of burial was 43 inches (107.5 cms.).

Two individuals weighed between 200 lbs. and 400 lbs. (90.8 kgs. and 181.8 kgs.). The average weight for these was 230 lbs. (104.5 kgs.) and the average depth of burial was 48 inches (120 cms.).

Three individuals weighed more than 400 lbs. (181.8 kgs.) each; and these were buried at an average depth of 122 inches (305 cms.).

Generally speaking we may say that the depth of burial increases with the diameter of the meteorite, though of course there are several factors which greatly modify this relationship. The shape and specific gravity of the meteorite; the angle and velocity at which it falls; and the nature of the soil, are all important factors in determining the depth of penetration.

As far as we know the majority of stony meteorites of less than 300 grams' weight do not completely bury themselves in the soil. Many stones as massive as one kilogram have been found freshly fallen on the surface of the soil and in at least a few instances stones as heavy as five or six kilograms have come to rest on ordinary soil without sinking into it even half their own diameter. Irons have buried themselves usually about 50 per cent deeper than stones, though several thousand small irons of the Estherville, Iowa, fall were picked up from the surface of the prairie several months after the fall.

On the other hand, some stones of small size have been known to bury themselves rather deeply, as, for instance, the Lumpkin stone of 12½ oz. (354 g.), which buried itself in the hard ground to a depth of 10 inches (25 cm.). Also, in the case of the Haviland, Kansas, crater, some small individuals were found associated with the larger ones even at the lowest levels of the pit.

Stones of weights between one and ten kilograms (2.2 lbs. and 22 lbs.) have been found usually in the cultivated layer of soil, being encountered by the plow. In order to escape the plow, a stone would have to be buried below about 4 inches (10 cm.) of soil.

As for depths reached by individuals of larger size than the 800-lb. (363-kg.) Paragould, Arkansas, stone, very little is known. Explorations in craters have so

far failed to settle the question as to whether large masses are present in their depths or whether the invading masses were broken up or destroyed by the impact. The writer's investigation of the Odessa, Texas, crater revealed an abundance of finely divided iron in the rim which surrounds the pit, and the excavation at Haviland revealed an abundance of finely pulverized meteoritic matter diffused through the soil of the crater. On the other hand, recent drillings and geophysical surveys at the Arizona "Meteor Crater" indicate the presence of iron masses of some size, about a thousand feet below the level of the plain.

At the present time we have no adequate basis for computing the magnitudes of meteoritic additions to the earth with any degree of accuracy. Obviously, this is a very difficult problem to solve, but its importance in our proper understanding of the earth's cosmic relations is equally obvious.

In order more rapidly to advance the quest for knowledge in this field, and for convenience in the proper recording of meteoritic falls in the future, we suggest that meteoritic additions to the earth be considered in four divisions, as follows:

Division 1. Atmospheric Additions. This will include all of the invading material which, during its aërial conflict, is reduced to dust and gases and in these forms is absorbed into the atmosphere more or less completely and permanently. There is of necessity some overlapping between this and the next division.

Division 2. Surface Residue. In this division will be considered all fragments or individuals which lodge on the surface of the soil or which fail to conceal themselves by burial in it. Here should be included those smaller particles which may for a time remain as dust clouds in the atmosphere but which finally settle down on the soil.

Division 3. Soil Intrusions. Here we consider all of those individuals or fragments which completely bury themselves, but which do not sink below the reach of the implements of cultivation. Ordinarily this would mean that the upper surfaces of the meteorites do not lie below a depth of 4 inches (10 cms.).

Division 4. Subsoil Intrusion. Here we consider all of those individuals which pass below the reach of the implements of cultivation; in other words, those whose upper surfaces lie below a depth of about 4 inches. When more has been learned about the behavior and condition of deeply buried masses, it may be found advisable to subdivide this division.

Obviously, the foregoing grouping applies only to falls which occur on the land portion of the earth. In cases where falls occur at sea, divisions 2, 3, and 4 would all be grouped together into one which might be called "Submarine Accretions."

The aforesaid divisions are arbitrary. They are suggested for the purpose of assisting in the making of more complete surveys of meteoritic falls than have been made in the past. Without any intention of boasting, the writer feels certain that he has spent more time in meteoritic surveys than any other man in America, or perhaps in the world, and yet he makes bold to state that never has there been, so far as he knows, a really adequate survey made.

On the other hand, he believes that the time is here when, by proper preparation and organization, it will be possible actually to determine, with a fair degree of accuracy, the amounts of material that come to earth from certain falls which may in the future occur in favorable locations. When a number of these surveys has been made and tabulated according to the preceding classification, it will be possible to establish ratios between the weights which fall in these various divisions, and, from these established ratios, to make reasonable estimates regarding

the amounts of material involved in falls which occur in less favorable locations.

By the application of modern appliances it should be possible also to form reasonably dependable estimates concerning the magnitude of dust clouds left in the wake of meteorites. By spectroscopic analyses, it will be not impossible to make quantitative determinations of the meteoritic gases in meteor trains.

### A Large Meteor Seen on September 6, 1934

*By* H. H. NININGER

Shortly after 8:00 P.M. on September 6, 1934, a large meteor was witnessed by people in all quarters of the State of Kansas, from many parts of Oklahoma, Nebraska, and Missouri, and throughout the Panhandle of Texas. An hour later, by long-distance telephone, the writer was informed by Mr. J. A. Nininger, of Hutchinson, Kansas, that the meteor had passed over that City, traveling in a southwesterly direction. Through the Associated Press, sufficient information was obtained to indicate that the meteor deserved to be investigated, and the following day a survey was begun by the Nininger Laboratory in the manner usually followed by that institution. This survey was made possible through the coöperation of Mr. Dean Gillespie of Denver. The survey was begun at Dodge City, Kansas, and was continued through Minneola and Ashland, Kansas; La Verne, Chaney, Shattuck, and Arnett, Oklahoma; Higgins, Glazier, Canadian, Miami, Pampa, Lefors, McLean, Shamrock, Wheeler, Bristol, and Mobeetie, Texas; besides some more distant points on the return trip. In all, 154 personal interviews were held, 12 lectures were given in high schools, and 20 newspaper interviews were obtained. Besides these, we had the benefit of the observations made by Mr. J. H. McVickers from North Bend, Nebraska, who recorded, by means of a transit, the elevation and direction of the meteor's path at two different points in its course.

Though the meteor had a visible course of at least 400 miles, and was described as being of amazing brilliance during the first half of its course, it seems to have dwindled in size and to have been much less spectacular near its point of disappearance. It is somewhat doubtful whether fragments survived to make a landing on the soil, although the meteor seems to have continued luminous to within a distance of about 10 or 12 miles of the lithosphere—a very good height for meteors yielding meteorites.

The meteor traveled in a direction about 36° west of south, passing over Hutchinson, Kansas, and between Shattuck and Arnett, Oklahoma. It vanished over a point about 6 miles northeast of Mobeetie, Texas, and was descending at an angle of between 8° and 9° where measured by Mr. McVickers. It seems to have been about 58 miles high when first sighted by Mr. McVickers, a few miles southwest of Brownville, Nebraska.

The meteor was apparently at its brightest as it passed over southern Kansas, where it was described as "fearfully bright" and appeared as large as a half moon. Many people in southern Kansas and in Oklahoma were considerably frightened, as were some in Texas. Detonations were reported only from Arnett, Oklahoma, where a strange "boom" was heard some time after the meteor passed. Several high-school girls heard this sound, after seeing the meteor, and wondered what caused it.

The hissing or swishing noise at the moment of passage, which has so often been recorded of meteors, was reported in this case from Hutchinson, Kansas, and also by some of the witnesses in Oklahoma and Texas. The majority of the witnesses said they heard no noise whatever. Many testified that the meteor burst

at the finish, while others reported seeing no scattering of sparks. The positive reports were in the majority.

A yellowish train remained visible to Hutchinson observers "about 10 minutes," by estimation, and to Dodge City observers, 10 minutes by the watch. It seems to have shown little change in shape in the course of this time.

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*Secretary's Address:* The Nininger Laboratory, 1955 Fairfax Street, Denver, Colorado.

*Editors' Address:* Department of Astronomy, University of California at Los Angeles.

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## The Relation of Group to Solo Counts in Meteor Work

By C. C. WYLIE

**(Second Paper)**

Some observations made under the direction of Father J. A. Theobald, and the earlier counts by Newton and Kleiber, were discussed in a paper which appeared with these notes in March, 1934. Because of the lack of agreement in results, it was thought worth while to make counts with specially arranged groups at the time of the 1934 Perseid shower.

Observations were made at Iowa City, Iowa, on the night of August 12-13 by a troop of boy scouts under the direction of Frank Swisher, a local scoutmaster. Mr. Bemrose Boyd, research assistant in astronomy, and Professor R. E. Crilley, of Iowa Wesleyan College, acted as recorders for the group. There were twelve observers, ten placed in a circle to watch the sky in all directions, and two lying on their backs to watch the region of the zenith. This is the arrangement used by Newton. The group recorded 167 meteors.

Observations were made at Briarcliff Manor, New York, by a troop of girl scouts under the direction of Miss Lou Williams, counsellor. Miss Williams used a group of thirteen, eleven in the circle and two watching the zenith. She and Miss Helen I. Shepherd acted as recorders. Five shifts were used to cover the period from 10:00 P.M. to 2:00 A.M. on the night of August 11-12, and 390 meteors were recorded.

Both groups worked with partly cloudy skies. Unfortunately, no instructions had been sent out for such conditions. The boys did the natural thing, what they had done on other counts. When a cloud covered the region assigned to a boy, he shifted his eyes above or to the side to watch open sky. The girls, however, kept their eyes pretty well on the region assigned, even though covered with clouds. The reduction shows that for this problem the latter procedure is better. If the eyes are shifted to avoid a cloud, the individual count is kept up, but the group total drops, because meteors behind the cloud are not seen. This lowers the ratio of groups to solo counts. If the observer keeps his eyes on his assigned region when a cloud appears, both his individual count and the group count are cut down. The average of the solo counts is probably lowered about as much as the group count. For both groups, it was noted that the ratio was a trifle higher in the clearest intervals, as would be expected.

The ratios for groups of various sizes from one to thirteen are given in the table below.

| Group | Boy Scouts | Girl Scouts |
|---|---|---|
| 1 | 1.00 | 1.00 |
| 2 | 1.77 | 1.83 |
| 3 | 2.34 | 2.61 |
| 4 | 2.72 | 3.33 |
| 5 | 2.97 | 4.19 |
| 6 | 3.20 | 4.80 |
| 7 | 3.30 | 5.31 |
| 8 | 3.40 | 6.06 |
| 9 | 3.51 | 6.47 |
| 10 | 3.56 | 7.02 |
| 11 | 3.65 | 7.16 |
| 12 | 3.72 | 7.64 |
| 13 | .... | 7.98 |

The 1934 Leonid maximum for Americans should occur on the night of November 16-17, but a watch should be maintained on the preceding night also. We have suggested to some of our workers that they arrange their groups and keep their records so that the counts can be used for this investigation.

University of Iowa, October 21, 1934.

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**Perseids in 1934**

The sky cleared luckily on August 11 at 8:00 P.M. and remained brilliantly clear until 1:45 A.M. and cleared again at 2:30 A.M. 298 Perseid meteors were observed. On August 12, 27 were seen in one hour; August 13 was somewhat overcast and 24 were seen in two hours; on August 15, 12 were seen, a total of 361.

| Mag. | 6 | 5 | 4 | 3 | 2 | 1 | 0 | —1 | —2 | —3 | —4 | —5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 63 | 45 | 21 | 58 | 47 | 41 | 35 | 25 | 12 | 11 | 1 | 2 |

Total 361

89 left trails; number 29, equalling the moon, left a green trail lasting 22 minutes, which drifted from $\beta$ Pegasi to $\pi$ Aquarii, the direction being from due north with a velocity of 250 kilometers per hour (estimated); number 81, equal to the moon, left a trail lasting 6 seconds and drifting from due north. The shower was quite active in the early evening, then became less so and reached a maximum of 66 in 45 minutes from 1:00 to 1:45 A.M.

| | | | | | |
|---|---|---|---|---|---|
| 9:30-10:00 | 14 | | 10:00-10:35 | 39 | August 11 |
| 10:35-11:00 | 29 | | 11:00-11:41 | 33 | |
| 11:41-12:15 | 31 | | 12:15-12:30 | 25 | |
| 12:30- 1:00 | 25 | | 1:00- 1:45 | 66 | |
| 1:45- 2:30 | 3 | Cldy. | 2:30- 3:20 | 33 | Total 298 |
| 2:30- 3:30 | 27 | | | | August 12 Total 27 |
| 12:00-12:30 | 18 | | 12:30- 2:00 | 6 | Aug. 13 Total 24 |
| 12:45- 2:00 | 12 | | | | August 15 Total 12 |

Cape Elizabeth, Maine, William Holt and Robert M. Dole, observers.

Mr. and Mrs. Neal Allen, August 11, 1934.

| | | | | |
|---|---|---|---|---|
| 9:30-10:00 | 19 | 10:00-10:30 | 22 | |
| 10:30-11:00 | 49 | 11:00-11:30 | 26 | Mr. Allen alone |
| 11:30-12:00 | 25 | 12:00-12:30 | 27 | |
| 12:30- 1:00 | 34 | 1:00- 2:30 | 73 | Mr. Allen alone |
| | | Total | 275 | |

Observations at Douglass Hill, Maine.

# Asteroid Notes

By HUGH S. RICE

The number of known asteroids is increasing every year, and new discoveries of these miniature worlds are constantly being made by astro-photographic methods. The headquarters for asteroid matters is the *Astronomischen Rechen-Institut* in Berlin-Dahlem, Germany. In their official handbook issued at the end of 1933, there were 1264 asteroids whose elements were known. By September 15, 1934, special bulletins coming direct from the *Rechen-Institut* showed that this number had been increased, so that the number of the last planet whose orbit had been computed was 1301.

This particular body had been provisionally called 1934 EA, indicating it was the first planet (A) discovered furing the first half of March (hence E), in 1934. A later step is the naming of the object by the discoverer. Some of the most recently-named asteroids are as follows: 1286 Banachiewicza, discovered by Arend; 1292 Luce, by Rigaux; 1202 Marina, by Neujmin; 1285 Julietta, 1290 Albertine, 1291 Phryne, 1293 Sonja, 1294 Antwerpia,—the last five by Delporte at Uccle, Belgium. It will be recalled that some of these observers have picked up new comets in the sky, probably from photo plates made of asteroids.

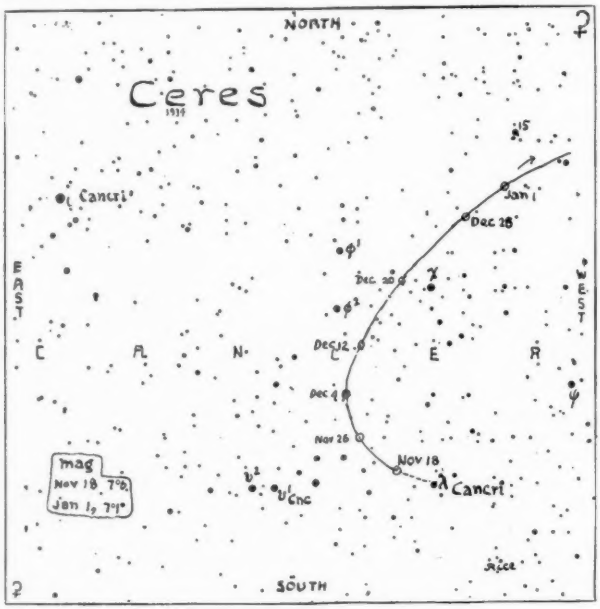
There seems to be much activity in Europe regarding minor planets. From September 19 to October 13, the special bulletins bring published data of 290 photographic observations that were made during the summer and autumn. Many negatives contain several asteroids. The photography and subsequent "reductions" entail a great amount of labor. In fact, we believe a great work is being done abroad, in finding new planets, and keeping up-to-date our knowledge of 1300 old ones. Every year, ephemerides of all known planetoids whose elements have been computed, are published by the *Astronomischen Rechen-Institut.*

When photographic observations of asteroids are made and reduced, the precise location of the objects is determined; a comparison can then be made with the ephemeris which had been given, and any discrepancy noted, or deviation of the ephemeris from the true position. This correction to the ephemeris is commonly given as position of observation minus position as computed. In 163 observations examined by this writer from the figures received within the last three weeks, the average correction was found to be $1^m.4$ in $\alpha$, and $7'.8$ in $\delta$. This quantity was obtained by taking the mean of entire sets, and omitting only one single (obviously wide) discrepancy in 14 tables of observations. The set of observations includes all the more uncommon or faint planets from 11th to 14th magnitudes. With those little planets which are of the better-known kind, more observations in the past have given computers better data, which have produced better ephemerides. Planet 3 Juno is an example. Five observations by E. de la Villemarqué, gave a correction in each case of $0^m.0$ and $0'.0$; similarly eight others in the lists inspected showed the same total lack of discrepancy in theory and observation. Numerous others were very close to this.

For small-telescope work, the asteroid 44 Nysa is still to be observed until November 18, with the help of the chart given last month. Ephemeris for this object was furnished by the *Rechen-Institut.* On November 10, minor planet 1 Ceres will be taking a position about coincident with $\lambda$ Cancri, as seen by the chart given herewith, or about 6° N.W. of the well-known cluster Praesepe in Cancer, and between this cluster and Pollux. The general location is easily found on any good star atlas, such as Norton's Star Atlas or the Himmels-Atlas by Schurig-Götz. Last year a new edition of each of these was published, with the

new constellation boundaries and a few other revisions.

Ceres will be seen to take a wide turn, going northeast and northward, and beginning its retrograde motion near the end of this year. Appearing in the eastern sky in the early morning hours, it will be perhaps somewhat inconvenient to




observe until later in the season. It can likely be followed, however, for a number of weeks throughout the winter; in fact, its magnitude (7.6 to 7.1 in November and December) is such as to permit observation with a 50-mm glass. The British Astronomical Association (of London) is responsible for the ephemeris from which we were able to plot the apparent course of Ceres. We propose later to give some further information regarding this first asteroid ever discovered.

American Museum of Natural History, New York City, October 24.

## Variable Stars

### Monthly Report of the American Association of Variable Star Observers for September, 1934

The present report contains the observations received during the latter part of August and the month of September. We welcome to our ranks as new observers E. H. Christman, Farmingdale, New York, George Diedrich and C. P. Frister, Milwaukee, Wisconsin, L. L. Doolittle, South Norwalk, Connecticut, A. P. Smith, Jr., Miami, Florida, C. D. Segers, Buenos Aires, Argentina, and G. R. Miczaiha, Berlin, Germany.

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

July 0 = J.D. 2427619; August 0 = J.D. 2427650; September 0 = J.D. 2427681.

| J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. |
|---|---|---|---|---|---|
| X AND | T CAS | R AND | RR AND | — CAS | W CAS |
| 001046 | 001755 | 001838 | 004533 | 004746b | 004958 |
| 693 13.6 Ie | 674 8.1 Dh | 686 10.2 Dl | 682 9.0 Jo | 667 10.6 Hk | 675 10.0 Ar |
| T CET | 674 8.1 Hk | 686 10.0 So | 686 9.1 Jo | 667 10.6 Pb | 675 9.9 Hk |
| *001620* | 675 8.2 Hk | 686 10.8 Jo | 691 9.0 Jo | 669 10.7 Pb | 675 10.0 Af |
| 651 6.6 Lt | 675 8.2 Fr | 691 11.2 Jo | 691 9.6 So | 669 10.6 Lf | 675 9.7 Gw |
| 655 6.9 Se | 675 8.2 Af | 691 10.6 Pt | RV CAS | 669 10.6 Tr | 678 9.7 Gw |
| 666 6.6 Lt | 675 8.2 Ar | 691 10.2 So | 004746a | 669 10.7 Ar | 679 10.0 Wd |
| 670 6.5 Lt | 675 8.2 Pb | 692 10.7 Hf | 652 13.6 Ar | 669 10.1 Pf | 679 9.5 Jo |
| 687 6.0 Lt | 677 8.4 Hf | 692 10.8 Cm | 653 13.9 Ar | 670 10.6 Ar | 680 9.7 Ko |
| T AND | 678 9.0 Mc | S TUC | 656 11.0 Jo | 670 10.6 Pb | 680 10.5 So |
| 001726 | 679 7.9 Sq | *001862* | 660 11.0 Jo | 670 10.7 Tr | 680 9.4 Hf |
| 653[12.3 Ra | 679 7.8 Jo | 634[13.2 Ht | 661 10.8 Jo | 671 10.6 Pb | 682 9.6 Jo |
| 663[11.8 Ch | 679 8.5 Wd | 655 13.2 En | 661 11.7 Pt | 671 10.6 Ar | 685 9.7 My |
| 686 13.2 So | 680 8.4 Wd | S CET | 663 11.7 Ar | 674 10.4 Ar | 686 9.8 Jo |
| 691 13.2 So | 680 8.3 Mn | *001909* | 665 10.9 Ar | 674 10.4 Pb | 691 10.0 Pt |
| T CAS | 680 8.6 So | 661 12.1 Pt | 665 10.8 Pb | 675 10.2 Pb | 692 9.3 Hf |
| 001755 | 681 8.0 Jo | 668 12.3 Sp | 666 10.9 Pb | 675 10.0 Hk | 693 9.8 My |
| 629 9.0 Mn | 682 8.4 Ah | 691[12.3 Pt | 666 10.8 Tr | 675 10.2 Ar | 697 9.9 My |
| 634 8.9 So | 683 8.4 Hf | Y CEP | 666 10.9 Ar | 678 10.7 Ar | U TUC |
| 635 8.6 Jo | 684 9.0 Mc | 003179 | 667 10.9 Ar | 678 10.8 Hk | *005475* |
| 635 9.1 Wd | 685 8.4 My | 685[13.9 Ie | 667 10.9 Hk | 678 10.7 Pb | 624[12.9 Ht |
| 636 8.7 Mn | 686 8.0 Jo | U CAS | 667 10.8 Pb | 679 10.7 Ar | 636 12.9 Ht |
| 639 8.4 My | 691 8.1 Pt | 004047a | 669 10.9 Pb | 686 11.0 Jo | Z CET |
| 640 8.4 Ra | 692 7.7 Hf | 658[13.3 Es | 669 10.9 Tr | 691 10.5 Pt | *010102* |
| 641 8.2 Jo | 693 8.4 My | 669[14.4 Pf | 669 10.7 Lf | W CAS | 663 11.8 Pt |
| 649 8.5 Jo | 696 8.0 Hz | 693 13.0 Ie | 669 10.9 Ar | 004958 | U AND |
| 649 8.7 Mn | 697 8.3 My | RW AND | 669 10.2 Pf | 634 9.7 So | 010940 |
| 651 8.3 Pk | R AND | 004132 | 670 10.9 Ar | 635 9.0 Jo | 693 12.7 Ie |
| 652 8.9 Mc | 001838 | 639 9.7 My | 670 10.9 Pb | 639 9.6 My | UZ AND |
| 653 8.4 Jo | 635 8.6 Jo | 653 10.2 Ra | 670 10.9 Tr | 640 9.7 Ra | 011041 |
| 653 8.0 Sq | 636 8.5 Wd | 655 10.6 Jo | 671 10.9 Pb | 641 9.7 Wd | 635 11.7 Jo |
| 654 8.6 So | 641 8.3 Jo | 659 10.7 Jo | 671 10.8 Ar | 641 8.9 Jo | 680 13.3 So |
| 655 8.5 Mn | 649 8.9 Jo | 660 10.7 My | 674 10.7 Ar | 649 9.0 Jo | 693 14.1 Ie |
| 656 8.1 Jo | 651 9.1 Kp | 661 10.9 Jo | 674 10.7 Pb | 653 9.0 Jo | S PSC |
| 658 8.8 Wd | 653 9.2 Kp | 661 10.6 Pt | 675 10.6 Pb | 654 9.6 Ko | 011208 |
| 660 8.0 My | 653 9.0 Jo | 665 10.3 My | 675 10.7 Ar | 654 10.0 So | 668 11.6 Sp |
| 660 8.0 Jo | 653 9.5 Ra | 667 10.8 Jo | 675 10.6 Hk | 656 9.3 Jo | S CAS |
| 661 8.4 Wd | 654 9.1 Ko | 668 10.7 My | 678 10.1 Hk | 660 9.4 Jo | 011272 |
| 661 8.0 Pt | 655 9.6 Lu | 680 11.9 Jo | 678 10.1 Ar | 660 9.7 My | 663[13.0 Pt |
| 661 8.5 Hf | 655 9.4 Kp | 680 11.3 So | 678 10.0 Pb | 661 9.0 Pt | 691[13.9 Ie |
| 663 8.4 Mw | 656 9.2 Jo | 685 11.2 Ie | 679 10.0 Jo | 665 9.7 My | U PSC |
| 663 8.4 Ru | 659 9.5 Jo | 685 11.3 My | 679 10.0 Ar | 667 10.5 So | 011712 |
| 663 8.4 Ch | 661 9.4 Pt | 691 11.5 Pt | 682 9.7 Jo | 667 9.5 Jo | 653 11.5 Jo |
| 663 8.3 Mw | 663 9.8 Ch | 691 11.5 So | 685 9.7 Ie | 667 9.9 Ra | 663 11.7 Pt |
| 665 8.1 My | 667 9.5 Jo | 693 11.3 My | 686 9.7 Jo | 668 9.9 Wd | 691[12.6 Gy |
| 666 8.0 Sq | 670 9.7 Jo | 697 11.7 My | 691 10.0 Pt | 668 9.6 My | RZ PER |
| 667 8.4 Ru | 678 10.2 Pb | V AND | — CAS | 669 9.7 Ar | 012350 |
| 667 8.0 Ra | 678 10.2 Hk | 004435 | 004746b | 669 9.7 Af | 655 10.5 Jo |
| 667 8.0 Jo | 678 10.2 Ar | 680 12.5 So | 652 10.8 Ar | 669 9.8 Fr | 656 10.0 Jo |
| 667 8.5 So | 679 9.5 Kp | RR AND | 653 10.8 Ar | 669 9.7 Pb | 659 10.0 Jo |
| 668 8.4 Wd | 679 10.4 Jo | 004533 | 661 10.6 Pt | 670 9.7 Gw | 667 10.4 Jo |
| 668 8.2 My | 680 10.2 Ko | 635 10.0 Jo | 663 10.7 Ar | 674 9.7 Gw | 682 9.8 Jo |
| 669 8.4 Ru | 680 9.8 Cm | 636 9.7 Jo | 665 10.8 Ar | 674 10.0 Hk | 691 9.7 Jo |
| 670 8.1 Jo | 680 10.2 Wd | 659 9.9 Jo | 665 10.9 Pb | 674 9.8 Ar | R PSC |
| 674 8.2 Tr | 681 9.7 Sq | 667 9.2 Jo | 666 10.6 Pb | 674 9.8 Pb | 012502 |
| 674 8.1 Pb | 681 10.5 Hf | 670 8.9 Jo | 666 10.6 Tr | 674 9.8 Fr | 653 8.0 Jo |
| 674 8.3 Ah | 681 10.5 Jo | 679 9.2 Jo | 666 10.6 Ar | 675 10.1 Fr | 655 7.7 Jo |
| 674 8.1 Ar | 682 10.2 Dl | 680 9.5 So | 667 10.6 Ar | 675 10.0 Pb | 663 7.0 Pt |

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R PSC | | | U PER | | | W AND | | | o CET | | | S PER | | | T ARI | | |
| 012502 | | | 015254 | | | 021143a | | | *021403* | | | 021558 | | | 024217 | | |
| 679 | 8.0 | Jo | 668 | 8.3 | My | 653 | 10.0 | Ko | 637 | 8.6 | Cy | 691 | 9.5 | Wd | 635 | 9.5 | Jo |
| 686 | 8.0 | Jo | 669 | 8.6 | Ru | 655 | 10.4 | Jo | 659 | 8.8 | Jo | 692 | 9.5 | Hf | 640 | 9.7 | Jo |
| 691 | 8.4 | Jo | 670 | 8.5 | Jo | 661 | 9.4 | Jo | 663 | 8.7 | Pt | 693 | 9.2 | My | 655 | 10.2 | Jo |
| 691 | 8.2 | Pt | 671 | 8.5 | Ry | 663 | 9.1 | Pt | 667 | 8.9 | Jo | 693 | 9.3 | Wd | 659 | 10.3 | Jo |
| 692 | 8.6 | Hf | 675 | 8.4 | Ar | 667 | 8.9 | Jo | 679 | 8.8 | Jo | 697 | 9.2 | My | 667 | 10.2 | Jo |
| 696 | 8.5 | Hz | 675 | 8.5 | Hk | 668 | 8.8 | BH | 683 | 8.8 | Cy | R CET | | | 681 | 10.2 | Jo |
| RU AND | | | 675 | 8.5 | Pb | 670 | 8.6 | Jo | 689 | 9.0 | Ra | *022000* | | | 686 | 10.4 | Jo |
| 013238 | | | 676 | 8.5 | Ry | 679 | 7.8 | Jo | 691 | 8.8 | Jo | 639 | 11.7 | My | W PER | | |
| 663 | 12.5 | Pt | 679 | 8.5 | Jo | 680 | 7.5 | Ko | 692 | 9.0 | Hf | 656 | 8.5 | Jo | 024356 | | |
| 691 | 12.0 | Pt | 680 | 8.6 | So | 680 | 8.0 | Hf | S PER | | | 668 | 8.2 | Jo | 634 | 9.7 | So |
| 693 | 11.3 | Ie | 680 | 8.6 | Hf | 680 | 8.2 | Ah | 021558 | | | 668 | 8.0 | My | 635 | 9.4 | Jo |
| Y AND | | | 681 | 8.6 | Kn | 681 | 8.0 | Jo | 623 | 9.7 | Cy | 691 | 7.8 | Jo | 636 | 9.9 | Cy |
| 013338 | | | 682 | 8.7 | Jo | 682 | 7.9 | Ah | 634 | 9.5 | Cy | 692 | 8.0 | Hf | 639 | 9.2 | My |
| 635 | 9.8 | Jo | 684 | 9.0 | Mc | 686 | 7.4 | Jo | 634 | 9.9 | So | 696 | 8.0 | Hz | 641 | 9.4 | Jo |
| 636 | 8.8 | Cy | 685 | 8.8 | My | 690 | 6.9 | Jo | 635 | 9.4 | Jo | 697 | 8.0 | My | 652 | 10.1 | Mc |
| 642 | 9.6 | Jo | 686 | 8.6 | Jo | 691 | 7.6 | Pt | 636 | 9.7 | Cy | RR PER | | | 653 | 9.6 | Jo |
| 653 | 9.8 | Jo | 688 | 8.6 | Ru | T PER | | | 637 | 9.8 | Cy | 022150 | | | 653 | 10.0 | Ko |
| 656 | 9.8 | Jo | 689 | 9.0 | Ru | 021258 | | | 639 | 9.0 | My | 654 | [14.1 | Fi | 654 | 10.0 | Ry |
| 661 | 10.1 | Jo | 691 | 8.8 | Jo | 635 | 8.6 | Jo | 641 | 9.4 | Wd | 663 | [12.9 | Pt | 656 | 9.3 | Ra |
| 663 | 10.0 | Pt | 691 | 8.7 | Pt | 641 | 8.5 | Jo | 641 | 9.4 | Jo | 679 | 13.8 | Wa | 658 | 10.1 | Sx |
| 670 | 10.2 | Jo | 692 | 8.7 | Hf | 641 | 9.2 | Wd | 643 | 9.8 | Cy | 691 | [12.9 | Pt | 660 | 9.9 | Ar |
| 680 | 11.8 | Jo | 693 | 8.7 | My | 653 | 8.7 | Jo | 653 | 9.2 | Jo | U CET | | | 660 | 9.8 | Pb |
| 691 | 11.8 | Pt | 697 | 8.8 | My | 653 | 9.3 | Lt | 654 | 9.4 | Cy | *022813* | | | 660 | 9.4 | My |
| X CAS | | | XX PER | | | 655 | 8.8 | Lu | 655 | 9.3 | Lu | 654 | 8.7 | Lt | 660 | 10.1 | Mc |
| 014958 | | | 015654 | | | 656 | 9.3 | Hr | 655 | 9.0 | Jo | 663 | 9.1 | Pt | 661 | 10.0 | Jo |
| 633 | 12.6 | Bn | 652 | 8.2 | Lt | 656 | 8.7 | Ra | 656 | 10.0 | Hr | RR CEP | | | 661 | 9.9 | Pb |
| 634 | 12.3 | So | 660 | 8.3 | Lt | 658 | 9.1 | Sx | 656 | 10.2 | Pk | 022980 | | | 662 | 10.0 | Pb |
| 649 | 12.0 | Jo | 687 | 8.3 | Lt | 661 | 8.8 | Jo | 656 | 9.5 | Ra | 663 | [12.9 | Pt | 662 | 10.0 | Ar |
| 655 | 12.2 | Jo | R ARI | | | 663 | 8.7 | Pt | 658 | 9.7 | Cy | 685 | [13.7 | Ie | 663 | 9.7 | Pt |
| 660 | 12.6 | Bn | 021024 | | | 663 | 9.0 | Ru | 658 | 9.5 | Sx | 691 | 13.5 | Pt | 665 | 9.5 | My |
| 661 | 12.5 | Jo | 635 | 8.7 | Jo | 667 | 8.7 | Jo | 660 | 9.3 | My | R TRI | | | 667 | 9.6 | Jo |
| 663 | 12.6 | Pt | 640 | 8.6 | Jo | 668 | 9.2 | Wd | 661 | 9.4 | Jo | 023133 | | | 667 | 10.0 | Hk |
| 665 | 12.6 | Bn | 653 | 8.3 | Jo | 669 | 9.0 | Wd | 663 | 9.0 | Pt | 635 | 7.5 | Jo | 667 | 10.0 | Tr |
| 674 | 11.7 | Ar | 655 | 8.0 | Jo | 669 | 9.0 | Ru | 663 | 9.5 | Ru | 640 | 7.8 | Jo | 667 | 9.9 | Pb |
| 674 | 11.6 | Pb | 658 | 7.7 | Ah | 669 | 9.2 | Lt | 665 | 9.0 | My | 653 | 8.0 | Jo | 667 | 9.9 | Ar |
| 675 | 11.6 | Dh | 659 | 8.4 | Jo | 670 | 8.7 | Jo | 667 | 9.5 | Jo | 653 | 8.2 | Hk | 668 | 9.6 | My |
| 680 | 12.5 | Jo | 661 | 8.3 | Jo | 679 | 8.7 | Jo | 667 | 9.7 | Ar | 653 | 8.2 | Ar | 669 | 9.8 | Af |
| 680 | 12.3 | So | 663 | 8.3 | Pt | 680 | 9.4 | Wd | 668 | 9.2 | My | 655 | 7.6 | Se | 669 | 9.8 | Fr |
| 691 | 12.4 | Pt | 667 | 8.5 | Jo | 680 | 9.3 | Hf | 668 | 9.5 | Wd | 656 | 8.8 | Ra | 669 | 10.0 | Lf |
| 691 | 12.5 | Jo | 670 | 8.5 | Jo | 681 | 8.6 | Jo | 669 | 9.2 | Wd | 657 | 9.1 | Sx | 669 | 9.9 | Ar |
| U PER | | | 674 | 8.0 | Ah | 686 | 8.7 | Jo | 669 | 9.7 | Ru | 661 | 8.6 | Jo | 669 | 9.8 | Pb |
| 015254 | | | 675 | 8.0 | Ar | 686 | 9.0 | Ra | 670 | 9.6 | Pb | 663 | 8.6 | Pt | 670 | 9.6 | Pb |
| 635 | 8.1 | Jo | 675 | 8.1 | Hk | 688 | 9.2 | Ru | 670 | 9.3 | Jo | 665 | 9.0 | Mw | 670 | 9.7 | Jo |
| 636 | 8.0 | Cy | 675 | 7.9 | Pb | 689 | 9.0 | Ru | 679 | 9.4 | Jo | 667 | 8.9 | Jo | 671 | 9.9 | Ar |
| 639 | 8.2 | My | 679 | 8.6 | Jo | 691 | 9.3 | Wd | 680 | 9.6 | So | 670 | 8.9 | Jo | 671 | 9.7 | Af |
| 642 | 8.0 | Jo | 680 | 8.8 | Hf | 691 | 9.3 | Pt | 680 | 9.6 | Hf | 674 | 9.0 | Ar | 671 | 9.6 | Pb |
| 652 | 8.8 | Mc | 680 | 8.5 | Ah | 692 | 9.3 | Hf | 680 | 9.4 | Wd | 674 | 9.1 | Fr | 671 | 10.1 | Ry |
| 653 | 8.2 | Jo | 681 | 8.6 | Jo | 693 | 9.1 | Wd | 681 | 9.2 | Sz | 675 | 9.0 | Dh | 674 | 9.8 | Ar |
| 654 | 8.4 | Ry | 682 | 8.5 | Ah | Z CEP | | | 681 | 9.8 | Cy | 679 | 9.4 | Jo | 674 | 9.9 | Af |
| 655 | 8.2 | Jo | 686 | 8.8 | Jo | 021281 | | | 681 | 9.3 | Jo | 681 | 9.6 | Jo | 674 | 9.8 | Fr |
| 660 | 8.0 | My | 691 | 9.3 | Jo | 656 | 10.1 | Ra | 685 | 9.2 | My | 682 | 9.3 | Ah | 674 | 9.8 | Pb |
| 661 | 8.4 | Jo | 691 | 9.0 | Pt | 663 | 10.6 | Pt | 686 | 9.0 | Jo | 686 | 9.7 | Jo | 675 | 9.9 | Pb |
| 663 | 8.3 | Ru | 692 | 9.0 | Hf | 682 | 11.2 | Md | 686 | 9.5 | Ra | 690 | 9.6 | Sx | 675 | 9.9 | Ar |
| 663 | 8.0 | Pt | 696 | 9.6 | Hz | 691 | 11.8 | Ie | 688 | 9.2 | Ru | 691 | 9.8 | Jo | 675 | 9.9 | Af |
| 665 | 8.4 | My | W AND | | | 691 | 11.8 | Pt | 689 | 9.4 | Ru | 691 | 9.8 | Pt | 675 | 9.9 | Fr |
| 667 | 8.5 | Jo | 021143a | | | o CET | | | 690 | 9.2 | Sx | 692 | 9.6 | Hf | 675 | 9.9 | Hk |
| 667 | 8.2 | Ar | 649 | 11.1 | Jo | *021403* | | | 691 | 9.7 | Gy | | | | 676 | 10.0 | Pb |
| 667 | 8.5 | Ru | 653 | 10.9 | Jo | 636 | 8.2 | Cy | 691 | 9.3 | Pt | | | | 676 | 10.1 | Ry |

## Variable Star Observations Received During September, 1934.

J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs.

**W Per**
024356
678 10.1 Hk
678 9.8 Pb
678 9.9 Ar
680 10.0 Ko
680 10.0 Cy
680 9.8 Jo
680 9.9 So
680 9.7 Hf
684 10.1 Mc
685 9.6 My
686 9.7 Jo
686 9.3 Ra
687 10.0 Mc
689 10.1 Ru
690 10.3 Sx
691 9.7 Pt
691 9.9 Wd
692 9.7 Hf
693 10.0 Wd
693 9.9 My
697 10.0 My

**U Ari**
030514
659 8.8 Jo
661 8.7 Jo
667 8.8 Jo
668 8.9 My
679 8.9 Jo
686 8.8 Jo
691 9.9 Gy
692 9.6 Hf

**X Cet**
*031401*
663 11.3 Pt
668 10.9 My
691 10.2 Jo
691 10.1 Gy
697 9.4 My

**Y Per**
032043
635 9.8 Jo
640 9.8 Jo
652 9.8 Mc
653 10.0 Jo
653 10.1 Jo
656 9.8 Ra
658 9.9 Ah
659 10.3 Jo
660 10.0 Mc
663 10.2 Pt
667 10.3 Ar
667 10.3 Jo
674 10.1 Pb
674 10.1 Hk
674 10.1 Ar
675 10.1 Ar
675 10.0 Hk
675 10.0 Pb

**Y Per**
032043
680 10.7 Jo
680 10.3 Ko
682 10.4 Ah
684 10.3 Mc
686 10.5 Jo
691 10.6 Jo
691 10.5 Pt
692 10.4 Hf

**R Per**
032335
639 12.2 My
661 11.0 Bn
663 11.0 Pt
665 11.4 My
667 11.1 Ar
668 11.1 My
675 10.7 Ar
675 10.6 Hk
675 10.6 Pb
686 10.0 Jo
691 9.5 Jo
691 9.3 Pt
692 9.2 Hf
693 9.2 My
697 9.3 My

**Nov Per**
032443
691 12.7 Pt
691 12.6 Gy

**U Cam**
033362
635 7.8 Jo
636 8.2 Cy
637 8.3 Cy
642 7.8 Jo
653 7.6 Jo
654 8.0 Cy
655 7.6 Jo
658 8.3 Cy
661 7.7 Jo
667 7.6 Jo
670 7.7 Jo
680 7.6 Jo
691 7.4 Jo

**X Per**
034930
654 6.4 Lt
660 6.6 Mc
662 6.4 Lt
684 6.4 Mc
687 6.4 Lt
692 6.3 Mc

**R Tau**
042209
663[12.0 Pt
675 13.5 Ar
691[12.0 Gy

**W Tau**
042215
640 10.8 Jo
663 10.4 Pt
667 10.3 Ar
668 10.3 My
674 10.2 Ar
674 10.2 Fr
675 10.4 Hk
675 10.3 Pb
675 10.2 Dh
675 10.3 Ar
676 10.3 Dh
680 10.7 Jo
686 10.6 Jo
689 10.6 Cy
691 10.4 Jo
692 10.2 Pt
692 10.6 Hf
697 10.0 My

**S Tau**
042309
663 13.2 Pt
675 11.3 Pb
675 11.3 Ar
691 10.4 Gy
692 10.0 Pt

**T Cam**
043065
635 8.4 Jo
640 8.4 Jo
653 8.4 Jo
654 8.5 Ko
655 8.6 Jo
661 8.5 Jo
663 8.4 Pt
667 8.5 Jo
670 8.4 Jo
677 8.3 Ko
679 8.4 Jo
686 8.4 Jo
691 8.4 Jo
692 8.8 Pt
692 8.8 Hf

**RX Tau**
043208
692[12.8 Pt

**R Ret**
*043263*
633[12.2 Bl

**X Cam**
043274
636 11.9 Cy
639 12.1 My
660 9.5 My
660 9.3 Jo
663 8.9 Pt
665 8.9 My
667 8.8 Kn
667 8.5 Jo

**X Cam**
043274
668 8.3 My
679 7.8 Jo
679 8.1 Kn
680 8.0 Cy
685 7.5 My
686 7.8 Jo
691 7.7 Jo
692 7.0 Pt
692 8.0 Hf
687 8.0 Kn
693 7.9 My
697 7.7 My

**R Dor**
*043562*
633 5.0 Bl
635 4.8 Bl

**V Tau**
044617
663 9.7 Pt
675 10.6 Ar
675 10.7 Hk
675 10.5 Pb
686 12.2 Jo
691 12.3 Gy
692 12.2 Pt

**AB Aur**
044930
654 7.0 Lt
687 7.0 Lt

**R Lep**
*045514*
680 5.7 Ko
686 6.7 Jo
691 6.7 Jo
691 7.3 Gy
692 6.3 Pt

**V Ori**
050003
663 12.4 Pt
692 12.9 Pt

**T Lep**
*050022*
692 12.7 Pt

**R Aur**
050953
675 11.2 Ar
675 11.3 Hk
675 11.1 Pb
635 8.4 Jo
649 8.8 Jo
653 9.0 Jo
655 8.9 Jo
663 9.0 Pt
667 9.3 Jo
675 9.2 Ar
675 9.2 Hk
675 9.2 Pb
679 9.7 Jo
681 10.2 Jo
686 10.7 Jo
692 9.8 Pt

**R Aur**
050953
692 10.9 Hf

**S Aur.**
052034
640 9.4 Jo
655 9.9 Jo
663 8.6 Pt
668 8.7 Jo
668 9.0 My
680 9.5 Ko
686 8.8 Jo
691 8.6 Jo
691 9.1 Gy
692 9.9 Hf
692 8.6 Pt
697 8.8 My

**W Aur**
052036
663[12.3 Pt
692[12.3 Pt

**S Ori**
*052404*
663 10.2 Pt
686 9.8 Jo
691 9.0 Gy
692 8.9 Pt

**T Ori**
*053005a*
660 9.8 Ar
660 9.8 Pb
662 9.6 Pb
662 9.6 Ar
663 10.3 Pt
667 9.9 Ar
667 9.9 Pb
675 10.0 Hk
675 9.9 Ar
675 9.9 Pb
680 9.9 Ko
686 10.9 Jo
692 9.7 Pt
697 10.4 My

**AN Ori**
*053005t*
675 11.2 Ar
675 11.3 Hk
675 11.1 Pb

**S Cam**
053068
635 8.4 Jo
639 8.6 My
641 8.5 Jo
653 8.6 Jo
655 8.6 Jo
661 8.7 Jo
663 8.7 Pt
665 8.8 My
667 8.6 Jo
668 8.8 My

**S Cam**
053068
680 8.7 Jo
685 9.2 My
686 8.7 Jo
691 9.0 Jo
692 9.3 Pt
692 9.6 Hf
693 9.4 My
697 9.3 My

**RR Tau**
053326
663 13.3 Pt
683 11.0 Wp
683 10.9 Wa
691 11.8 Gy
692 11.8 Pt

**RU Aur**
053337
663 11.1 Pt
668 11.2 My
692 12.2 Pt
697 12.3 My

**U Aur**
053531
663 8.2 Pt
686 8.7 Jo
691 8.9 Jo
692 9.1 Pt

**SU Tau**
054319
657 10.3 Ma
663 11.4 Pt
675 10.7 Ar
675 10.8 Hk
691 10.6 Ie
691 10.1 Gy
692 10.3 Pt

**α Ori**
054907
687 10.0 Lt

**U Ori**
054920a
663 12.0 Pt
675 10.5 Ar
675 10.4 Hk
675 10.4 Pb
686 11.6 Jo
691 11.2 Jo
691 11.0 Gy
692 10.9 Pt

**V Cam**
054974
663 10.0 Pt
667 10.5 Jo
671 10.0 Jo
681 9.7 Jo
686 9.7 Jo
691 10.0 Jo
692 9.8 Pt

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. |
|---|---|---|---|---|---|
| Z AUR | RS GEM | W PUP | R CAR | 1 CAR | S CAR |
| 055353 | 065530 | *074241* | *092962* | *094264* | *100661* |
| 635 10.2 Jo | 686 10.6 Jo | 623 9.2 En | 485 4.5 Ss | 624 3.6 En | 646 6.6 Sl |
| 638 9.9 Pt | 691 10.7 Jo | 629 9.4 En | 488 4.4 Ss | 625 3.5 Sl | 647 6.9 En |
| 640 10.4 Jo | V CMI | 630 9.5 Dk | 490 4.2 Ss | 626 3.6 En | 649 6.8 Dk |
| 652 10.2 Mc | 070109 | 633 9.4 Bl | 494 4.5 Ss | 633 3.8 En | 658 7.6 En |
| 655 10.5 Jo | 691 8.8 Gy | 634 9.4 En | 496 4.5 Ss | 635 3.8 En | U UMA |
| 661 10.6 Jo | 692 8.5 Pt | 646 10.5 Bl | 503 4.6 Ss | 639 3.9 Sl | 100860 |
| 663 10.5 Pt | R GEM | T GEM | 505 4.6 Ss | 641 3.9 Sl | 620 6.6 Mn |
| 691 9.8 Gy | 070122a | 074323 | 511 4.7 Ss | 643 3.9 Sl | 629 6.4 Mn |
| 691 10.6 Jo | 692[12.7 Pt | 686 9.4 Jo | 531 5.3 Ss | 648 4.2 Sl | 635 6.5 Lt |
| 692 10.7 Mc | Z GEM | 692 10.5 Pt | 535 5.6 Ss | Y HYA | 636 6.3 Mn |
| 692 10.3 Pt | 070122b | R CNC | 554 6.3 Ss | *094622* | 649 6.6 Mn |
| R OCT | 692 12.5 Pt | 081112 | 561 6.5 Ss | 537 7.2 Mg | 655 6.5 Mn |
| *055686* | TW GEM | 692 8.9 Pt | 564 6.6 Ss | 619 7.0 En | 656 6.8 Hr |
| 624[12.0 Ht | 070122c | RT HYA | 565 6.7 Ss | 633 7.5 En | 660 6.5 Lt |
| 633 12.1 Bl | 687 8.2 Lt | *082405* | 566 6.7 Ss | Z VEL | 670 6.7 Hr |
| 658[12.0 En | 692 8.1 Pt | 566 8.3 Fn | 567 6.8 Ss | *094953* | 680 6.6 Mn |
| X AUR | R CMI | R CHA | 570 7.1 Ss | 619 9.6 En | 687 6.5 Lt |
| 060450 | 070310 | *082476* | 571 7.2 Ss | 622 10.7 Dk | Z CAR |
| 663 11.3 Pt | 691 10.8 Gy | 619 8.6 En | 572 7.2 Ss | 623 10.8 Ht | *101058a* |
| 686 9.2 Jo | 692 10.8 Pt | 623 8.7 Ht | 574 7.8 Ss | 629 10.9 Ht | 619[12.6 En |
| 691 9.0 Jo | R VOL | 629 8.6 Ht | 577 8.0 Ss | 630 10.9 Dk | 623[12.6 Ht |
| 692 9.4 Pt | *070772* | 633 8.6 Bl | 602 8.9 Ss | 633 10.7 Bl | 633[12.6 Bl |
| V AUR | 623[12.6 Ht | 633 8.4 En | 617 9.4 Ss | 633 11.0 En | W VEL |
| 061647 | 634[13.4 Ht | 634 8.3 Ht | 619 9.4 En | 634 11.1 Ht | *101153* |
| 691 10.6 Jo | $L_2$ PUP | 639 8.7 Sl | 622 9.0 Dk | 636 11.2 Dk | 619 9.3 En |
| 691 11.3 Gy | *071044* | 646 9.2 Bl | 623 9.3 Ht | 639 11.2 Sl | 623 10.0 Ht |
| V MON | 619 3.8 Sl | 647 8.6 En | 629 9.4 Ht | 646 11.2 Bl | 629 9.6 Ht |
| *061702* | 625 4.0 Sl | 648 8.6 Sl | 630 9.1 Dk | 647 11.8 En | 633 9.0 En |
| 692 11.4 Pt | 641 4.5 Sl | 653 8.7 En | 633 9.2 Bl | 648 11.2 Sl | 633 9.1 Bl |
| UU AUR | V GEM | 658 8.7 En | 633 9.2 En | 658 12.1 En | 634 9.1 Ht |
| 062938 | 071713 | T HYA | 634 9.6 Ht | RR CAR | 646 8.5 Bl |
| 654 5.5 Lt | 692[12.2 Pt | *085008* | 636 9.3 Dk | *095458* | 647 8.7 En |
| U LYN | S CMI | 537 8.2 Mg | 639 9.2 Sl | 619 8.0 En | 658 8.3 En |
| 063159 | 072708 | T PYX | 642 9.3 Dk | 623 7.9 Ht | RZ CAR |
| 686 9.6 Jo | 564 8.5 Fn | *090031* | 646 9.2 Sl | 629 7.6 Ht | *103270* |
| 691 9.6 Jo | 692 10.0 Pt | 633 [s Bl | 646 9.2 Bl | 634 7.5 Ht | 619 10.8 En |
| NOV PIC | 692 10.3 Cm | V UMA | 647 9.7 En | 647 7.7 En | 623 10.7 Ht |
| *063462* | T CMI | 090151 | 649 9.4 Dk | 658 7.7 En | 629 10.9 Ht |
| 619 9.0 En | 072811 | 652 10.5 Mc | 658 9.7 En | RV CAR | 634 11.1 Ht |
| 623 8.4 Ht | 692 12.6 Pt | 691 10.8 Jo | X HYA | *095563* | 635 11.5 En |
| 629 8.4 Ht | S VOL | RW CAR | *093014* | 623 13.1 Ht | 647 12.0 En |
| S LYN | *073173* | *091868* | 537 9.6 Mg | 629 13.2 Ht | 658[13.1 En |
| 063558 | 623 11.6 Ht | 619[12.8 En | Y DRA | 633 13.3 Bl | R UMA |
| 671 13.0 Ry | 629 11.2 Ht | 629[12.8 Ht | 093178 | 647[13.1 En | 103769 |
| X GEM | 633 11.8 Bl | 634 12.7 Ht | 646 11.8 Ra | S CAR | 608 12.1 Cy |
| 064030 | 634 11.1 Ht | 658[12.2 En | R LMI | *100661* | 626 12.8 Hi |
| 686 8.6 Jo | 635 12.0 Bl | Y VEL | 093934 | 619 6.0 En | 649 12.5 Pt |
| 691 8.4 Jo | 646 11.9 Bl | *092551* | 627 9.4 Hi | 622 6.1 Dk | 654 12.7 So |
| 691 8.5 Gy | U CMI | 619 10.8 En | 655 7.9 Hh | 623 6.0 Ht | 655 12.4 Wd |
| Y MON | 073508 | 623 10.8 Ht | RR HYA | 629 6.5 Ht | 656 12.8 Ch |
| 065111 | 692 12.4 Pt | 629 11.0 Ht | *094023* | 630 6.3 Dk | 663 12.3 So |
| 692 12.1 Pt | S GEM | 633 10.8 En | 619 13.4 En | 633 6.2 En | 667 12.0 Ra |
| X MON | 073723 | 633 11.0 Bl | 633[12.8 En | 633 6.7 Bl | 670 12.4 Wd |
| *065208* | 692[12.4 Pt | 634 11.3 Ht | 1 CAR | 634 6.4 Ht | 676 10.2 Fs |
| 459 7.9 Mi | W PUP | 646 11.6 Bl | *094264* | 636 6.5 Dk | 677 12.0 Hi |
| 481 7.5 Mi | *074241* | 647 11.3 En | 617 4.4 En | 639 6.4 Sl | 679 12.0 Wd |
| 512 7.8 Mi | 619 9.1 En | | 618 4.2 En | 642 6.5 Dk | 679 11.8 Pt |
| | 622 8.8 Dk | | 621 3.7 En | 646 6.8 Bl | 679 11.8 So |

## Variable Star Observations Received During September, 1934.

J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs.

R UMa
103769
680 12.0 Wd
681 12.1 Jo
684 11.5 So
686 11.6 Jo
690 11.2 Jo
690 11.7 So
691 12.0 Gy
V Hya
*104620*
619 7.1 En
633 7.2 Bl
646 7.7 Bl
RS Hya
*104628*
633[12.9 Bl
W Leo
104814
537 14.0 Mg
RS Car
*110361*
633[12.3 En
658[12.3 En
S Leo
110506
537[13.5 Mg
590 11.6 Mg
RY Car
*111561*
619[13.1 En
623[13.1 Ht
633[13.1 Bl
658[13.1 En
RS Cen
*111661*
619 10.8 En
623 10.9 Ht
629 10.2 Ht
633 9.5 Bl
634 9.9 Ht
635 9.5 En
639 9.2 En
646 8.3 Bl
647 9.0 En
651 8.6 En
658 8.6 En
X Cen
*114441*
619 13.0 En
624 12.3 Ht
631 12.6 Ht
633 12.5 Bl
635 12.6 En
636 12.4 Ht
658[12.2 En
AD Cen
*114858*
623 9.5 Ht
629 9.5 Ht

AD Cen
*114858*
634 9.4 Ht
W Cen
*115058*
619 9.9 En
623 10.3 Ht
629 9.6 Ht
633 9.2 Bl
634 9.3 Ht
635 9.5 En
646 9.1 Bl
647 9.1 En
658 8.6 En
Z UMa
115158
633 7.1 Bp
636 7.3 Bp
639 7.3 Bp
651 7.6 Kp
651 7.7 Rb
653 7.6 Kp
654 7.6 Bp
655 7.2 Kp
655 7.9 Rb
656 7.8 Rb
658 7.8 Rb
661 7.8 Rb
667 7.6 Rb
671 7.7 Rb
676 8.0 Rb
677 7.9 Kp
679 8.2 Bp
679 7.7 Rb
680 7.9 Rb
R Com
115919
590 10.7 Mg
SU Vir
120012
590 13.0 Mg
T Vir
*120905*
590[13.8 Mg
R Crv
*121418*
630 10.6 Sp
639 10.9 Sl
646 10.9 Sl
RY UMa
121561
635 7.4 Lt
653 7.5 Lt
687 7.7 Lt
SS Vir
122001
590 8.6 Mg
630 8.3 Sp
636 7.6 Jo
637 7.7 Jo

SS Vir
122001
641 7.4 Ho
649 7.5 Jo
651 8.2 Sp
656 7.0 Jo
T CVn
122532
608 10.4 Cy
626 10.5 Hi
635 10.5 Jo
636 10.6 Rc
637 10.5 Jo
640 10.6 Hi
641 10.4 Jo
648 10.4 Hi
648 10.7 Ch
649 10.2 Rc
649 10.4 Jo
649 10.5 Pt
650 9.8 Cy
653 10.9 Jo
655 10.7 Jo
657 10.3 Md
659 11.0 Jo
661 10.4 Rc
664 10.3 Rb
667 10.3 Rb
667 10.6 Jo
668 10.3 Jo
677 10.4 Hi
679 10.1 Md
679 10.2 Pt
Y Vir
*122803*
590 13.6 Mg
U Cen
*122854*
623 8.5 Ht
629 8.5 Ht
633 8.7 Bl
634 8.7 Ht
635 8.4 En
639 9.1 En
647 9.0 En
658 10.0 En
T UMa
123160
620 10.2 Mn
629 9.3 Mn
629 9.0 Ra
634 9.0 So
635 8.8 Jo
636 8.9 Rc
636 8.6 Mn
637 8.9 Kg
641 8.3 Wd
641 8.3 Jo
642 8.4 Rc
648 8.2 Ch

T UMa
123160
649 8.2 Jo
649 8.1 Mn
649 8.1 Pt
650 8.0 Rc
651 7.9 Wd
651 8.1 Pk
652 7.9 Wh
653 7.9 Jo
654 7.5 Lu
654 8.2 Sz
654 8.0 So
655 7.7 Lu
655 7.7 Mn
656 7.7 Jo
656 7.7 Mc
657 7.6 Lu
658 7.5 Ah
658 7.6 Kg
658 7.6 Lr
659 7.9 Rc
659 7.7 Jo
660 7.4 Mc
660 7.8 Md
661 7.8 Rc
663 7.3 Bc
663 7.9 Md
663 7.5 So
664 7.4 Lu
667 7.7 Ra
667 7.5 Jo
667 7.2 Mn
668 7.7 Wd
668 7.8 Rc
669 7.3 Bc
670 7.3 Jo
670 7.1 Wd
671 7.3 Bc
671 7.3 Kg
672 7.3 Bc
674 7.3 Bc
674 7.0 Ah
675 7.2 Bc
676 8.0 Rc
677 7.1 Wd
677 7.7 Fs
677 7.5 Lu
677 7.2 Hf
678 7.9 Rc
678 7.4 Mc
679 7.3 Wd
679 7.2 Pt
679 7.2 Bc
679 7.5 Md
679 7.5 Jo
680 7.4 Jo
680 6.8 Mn
680 7.0 Ah
682 7.8 Rc

T UMa
123160
682 7.1 Ah
683 7.4 Mc
684 7.7 Mc
685 7.6 Md
685 7.6 Hf
686 7.3 Jo
687 7.7 Mc
689 8.0 Rc
690[ 7.6 Sx
690 7.9 So
692 7.8 Mc
R Vir
123307
565 7.4 Ss
566 7.6 Ss
567 7.6 Ss
636 10.0 Jo
641 11.1 Ch
649 11.5 Pt
651 10.5 Sp
RS UMa
123459
617 9.1 Bg
620 9.3 Mn
629 9.4 Mn
629 9.9 Ra
633 9.4 Bn
634 10.9 So
635 9.8 Jo
636 10.4 Rc
636 10.4 Cy
636 10.1 Mn
637 11.8 Kg
641 10.4 Jo
648 11.2 Ch
649 11.0 Jo
649 10.8 Mn
649 10.3 Rc
649 11.5 Pt
650 11.1 Cy
651 11.5 Pk
653 11.2 Jo
653 11.5 Wd
654 11.3 So
654 11.6 Ry
655 11.0 Mn
656 11.6 Jo
656 11.1 Mc
659 12.0 Jo
660 11.8 Md
660 12.3 Bn
663 12.3 Md
665 12.4 Bn
667 12.0 Ra
667 12.1 Ry
670 12.4 Wd
677 13.3 Ma

RS UMa
123459
679 12.7 Wd
679 12.9 Md
679 12.4 Pt
679 12.4 Ry
679 13.5 So
686 13.3 So
690 13.5 So
S UMa
123961
620 10.1 Mn
629 9.5 Mn
629 9.0 Ra
634 8.5 So
635 8.8 Jo
636 9.3 Mn
636 8.9 Rc
637 8.8 Kg
641 8.7 Jo
641 9.0 Wd
648 8.6 Ch
649 8.4 Jo
649 8.4 Pt
649 8.9 Mn
651 8.7 Mc
651 8.9 Wd
651 8.7 Pk
652 8.5 Wh
653 8.6 Jo
654 8.6 Lu
654 8.3 Sz
654 8.5 So
655 8.7 Lu
655 9.0 Mn
656 8.5 Jo
656 8.7 Mc
657 8.5 Lu
658 8.6 Kg
658 8.5 Ah
658 8.7 Lr
659 8.5 Jo
660 8.3 Mc
661 8.4 Rc
663 8.6 Bc
663 7.9 So
664 8.4 Lu
667 8.4 Jo
667 8.7 Ra
668 8.5 Wd
669 8.6 Bc
670 8.4 Wd
670 7.9 Jo
671 8.4 Bc
671 8.3 Kg
672 8.4 Bc
674 8.3 Bc
674 8.0 Ah
675 8.3 Bc
677 8.4 Wd

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S UMA** | | | **R HYA** | | | **T CEN** | | | **RR VIR** | | | **U UMI** | | | **V BOO** | | |
| 123961 | | | *132422* | | | *133633* | | | *135908* | | | 141567 | | | 142539a | | |
| 677 | 8.0 | Fs | 620 | 5.1 | En | 636 | 8.2 | Ht | 649 | 12.6 | Pt | 679 | 11.2 | Pt | 641 | 8.8 | Jo |
| 677 | 8.2 | Lu | 622 | 4.7 | Dk | 639 | 7.8 | Sl | **Z BOO** | | | 680 | 11.2 | Hf | 642 | 9.7 | Wd |
| 677 | 8.1 | Ma | 624 | 5.0 | Ht | 646 | 7.2 | Sl | 140113 | | | 681 | 10.7 | Cy | 649 | 9.4 | Pt |
| 677 | 8.3 | Hf | 626 | 5.4 | En | 646 | 7.6 | Bl | 677 | [13.4 | Ma | 681 | 11.0 | Jo | 649 | 9.6 | Mn |
| 678 | 8.0 | Mc | 630 | 5.2 | Dk | 649 | 7.4 | En | **RU HYA** | | | 682 | 11.7 | Kn | 650 | 9.3 | Cy |
| 678 | 8.0 | Rc | 631 | 5.1 | Ht | 658 | 6.5 | En | *140528* | | | 682 | 10.9 | Ah | 653 | 9.0 | Jo |
| 679 | 8.3 | Wd | 633 | 5.5 | Bl | **RT CEN** | | | 620 | 9.4 | En | 685 | 10.9 | Es | 653 | 9.6 | Sq |
| 679 | 8.4 | Bc | 636 | 5.1 | Ht | *134236* | | | 624 | 9.9 | Ht | 686 | 10.8 | Jo | 655 | 9.7 | Mn |
| 679 | 8.0 | Pt | 636 | 5.5 | Dk | 620 | 13.0 | En | 631 | 10.1 | Ht | 690 | 10.8 | Wa | 656 | 9.9 | Mc |
| 679 | 7.7 | So | 642 | 5.5 | Dk | 624 | 12.4 | Ht | 634 | 10.4 | Bl | 691 | 10.7 | Jo | 657 | 9.9 | Sx |
| 680 | 8.0 | Lu | 646 | 5.6 | Bl | 631 | [11.9 | Ht | 636 | 10.8 | Ht | **S BOO** | | | 658 | 10.0 | Pk |
| 680 | 8.0 | Jo | 649 | 5.5 | Dk | 633 | 13.3 | Bl | 646 | 10.6 | Bl | 141954 | | | 659 | 9.3 | Jo |
| 680 | 8.3 | Mn | 649 | 5.8 | En | 636 | [11.8 | Ht | 649 | 11.0 | En | 629 | 8.6 | Ra | 660 | 9.9 | Mc |
| 680 | 8.0 | Ah | 651 | 5.5 | Ch | 649 | 13.0 | En | 658 | 11.0 | En | 635 | 8.6 | Jo | 663 | 9.8 | Sq |
| 682 | 7.9 | Ah | 658 | 6.0 | En | 658 | 13.0 | En | **R CEN** | | | 637 | 8.6 | Jo | 664 | 9.7 | Ch |
| 682 | 7.6 | Rc | **S VIR** | | | **R CVN** | | | *140959* | | | 639 | 9.0 | Ch | 667 | 10.0 | Ra |
| 683 | 8.2 | Mc | *132706* | | | 134440 | | | 620 | 7.8 | En | 641 | 8.7 | Jo | 667 | 9.8 | Mn |
| 684 | 8.0 | Mc | 621 | 10.6 | En | 617 | 10.9 | Bg | 622 | 8.0 | Dk | 642 | 8.5 | Wd | 667 | 9.7 | Gw |
| 685 | 8.2 | Hf | 624 | 10.0 | Ht | 634 | 10.9 | So | 623 | 7.9 | Ht | 649 | 9.0 | Pt | 667 | 9.6 | Jo |
| 686 | 8.1 | So | 631 | 10.0 | Ht | 635 | 10.6 | Jo | 629 | 8.2 | Ht | 653 | 9.1 | Jo | 670 | 9.5 | Jo |
| 686 | 7.7 | Jo | 636 | 10.0 | Ht | 641 | 9.8 | Jo | 630 | 8.1 | Dk | 653 | 9.4 | Sq | 674 | 9.7 | Gw |
| 687 | 7.9 | Mc | 648 | 9.3 | Ch | 646 | 10.3 | Ra | 634 | 8.1 | Bl | 656 | 9.6 | Jo | 675 | 9.9 | Gw |
| 690 | 7.9 | Sx | 649 | 9.2 | En | 649 | 10.3 | Pt | 634 | 8.7 | Ht | 658 | 9.2 | Cl | 675 | 9.8 | Sq |
| 690 | 7.5 | So | 649 | 8.4 | Pt | 653 | 9.8 | Jo | 636 | 8.5 | Dk | 661 | 9.3 | Kn | 677 | 9.8 | Sf |
| 692 | 7.5 | Rc | 654 | 8.7 | Bp | 654 | 10.3 | So | 638 | 8.3 | En | 661 | 9.7 | Jo | 678 | 9.9 | Gw |
| **RU VIR** | | | 658 | 8.1 | En | 655 | 9.8 | Jo | 639 | 7.8 | Sl | 663 | 9.5 | Sq | 678 | 9.6 | Cy |
| 124204 | | | 669 | 7.8 | Ch | 661 | 9.6 | Jo | 642 | 8.3 | Dk | 664 | 9.4 | Ch | 679 | 9.4 | Jo |
| 590 | 13.4 | Mg | **RV CEN** | | | 661 | 10.1 | Kn | 646 | 7.9 | Sl | 667 | 9.7 | Ra | 679 | 9.4 | Pt |
| 649 | [12.4 | Pt | *133155* | | | 663 | 10.1 | So | 646 | 8.0 | Bl | 667 | 9.6 | Jo | 679 | 9.7 | Hf |
| **U VIR** | | | 620 | 7.6 | En | 667 | 10.2 | Ra | 649 | 8.8 | Dk | 670 | 9.7 | Jo | 680 | 9.9 | Mn |
| *124606* | | | 623 | 7.4 | Ht | 667 | 9.8 | Jo | 649 | 8.3 | En | 670 | 9.9 | Wd | 680 | 9.8 | Kn |
| 590 | 8.3 | Mg | 629 | 7.3 | Ht | 670 | 9.4 | Jo | 654 | 9.2 | En | 676 | 10.5 | Jo | 682 | 9.5 | Ah |
| 626 | 9.0 | Hi | 633 | 7.5 | Bl | 679 | 9.6 | Pt | 658 | 9.2 | En | 678 | 10.0 | Cl | 682 | 9.3 | Jo |
| 648 | 9.5 | Hi | 634 | 7.3 | Ht | 679 | 9.6 | So | **U UMI** | | | 679 | 10.0 | Jo | 684 | 9.7 | Mc |
| 649 | 9.4 | Pt | 646 | 7.8 | Bl | 680 | 9.5 | Jo | 141567 | | | 679 | 10.2 | Pt | 685 | 9.8 | Hf |
| 651 | 9.7 | Sp | 649 | 8.0 | En | 682 | 9.3 | Jo | 626 | 12.0 | Hi | 679 | 10.3 | Hf | 685 | 9.6 | Sx |
| **U OCT** | | | 658 | 8.2 | En | 682 | 9.8 | Kn | 635 | 11.8 | Jo | 682 | 10.2 | Kn | 686 | 9.2 | Jo |
| *131283* | | | **T UMI** | | | 686 | 9.1 | Jo | 636 | 10.7 | Wh | 682 | 10.2 | Jo | 692 | 9.4 | Mc |
| 620 | 8.4 | En | 133273 | | | 686 | 9.6 | So | 637 | 11.9 | Cy | 691 | 10.8 | Jo | **R CAM** | | |
| 622 | 7.7 | Dk | 637 | 12.2 | Cy | 690 | 8.7 | So | 640 | 12.0 | Hi | **RS VIR** | | | 142584 | | |
| 624 | 8.2 | Ht | 646 | 11.9 | Ra | 691 | 9.0 | Jo | 640 | 11.7 | Jo | 142205 | | | 626 | 10.5 | Hi |
| 630 | 7.5 | Dk | 650 | 11.7 | Cy | **RX CEN** | | | 648 | 12.0 | Hi | 637 | 10.1 | Jo | 635 | 11.5 | Jo |
| 631 | 8.2 | Ht | 658 | 11.4 | Cy | *134536* | | | 649 | 12.5 | Pt | 642 | 9.2 | Jo | 637 | 11.1 | Cy |
| 633 | 8.3 | Bl | 667 | 10.6 | Ra | 620 | 9.0 | En | 650 | 12.0 | Cy | 653 | 9.4 | Ko | 640 | 12.1 | Jo |
| 635 | 8.2 | En | 671 | 10.1 | Wd | 624 | 9.3 | Ht | 650 | 12.4 | Fi | 655 | 8.8 | Jo | 640 | 11.5 | Hi |
| 636 | 8.1 | Ht | 671 | 10.1 | Sh | 631 | 9.3 | Ht | 651 | 12.4 | Pk | 661 | 8.8 | Jo | 648 | 11.7 | Hi |
| 636 | 7.5 | Dk | 681 | 9.4 | Kn | 634 | 9.0 | Bl | 655 | 11.4 | Jo | 667 | 9.0 | Jo | 648 | 11.3 | Ch |
| 642 | 7.6 | Dk | 681 | 9.1 | Cy | 636 | 9.3 | Ht | 656 | 11.7 | Es | 677 | 8.4 | Ko | 653 | 12.0 | Ra |
| 646 | 9.0 | Bl | 681 | 9.0 | Jo | 646 | 9.2 | Bl | 658 | 11.4 | Cy | 691 | 8.8 | BH | 658 | 12.0 | Wd |
| 649 | 7.7 | Dk | 686 | 8.8 | Jo | 649 | 9.3 | En | 661 | 11.0 | Jo | **V BOO** | | | 658 | 11.1 | Cy |
| 649 | 8.9 | En | 691 | 8.7 | Jo | 658 | 9.9 | En | 661 | 12.0 | Kn | 142539a | | | 661 | 12.1 | Kn |
| 658 | 9.0 | En | **T CEN** | | | **T APS** | | | 663 | 11.8 | Md | 619 | 9.1 | Mn | 676 | 12.2 | Hi |
| **V CVN** | | | *133633* | | | *134677* | | | 667 | 11.8 | Ra | 629 | 9.3 | Mn | 680 | 12.4 | Wd |
| 131546 | | | 591 | 6.3 | Kd | 620 | [13.2 | En | 667 | 11.8 | Wp | 629 | 9.5 | Ra | 682 | 12.6 | Kn |
| 635 | 6.9 | Lt | 620 | 6.8 | En | 634 | [13.2 | Bl | 667 | 11.7 | Wa | 635 | 8.6 | Jo | **R BOO** | | |
| 653 | 7.0 | Lt | 624 | 7.5 | Ht | 658 | [13.2 | En | 676 | 11.0 | Hi | 636 | 9.2 | Cy | 143227 | | |
| 687 | 8.0 | Lt | 631 | 8.0 | Ht | | | | 677 | 10.7 | Wh | 636 | 9.5 | Mn | 633 | 11.6 | Bp |
| | | | 633 | 7.9 | Bl | | | | 677 | 10.8 | Ma | 639 | 8.6 | Ch | 637 | 11.4 | Bp |

## Variable Star Observations Received During September, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R Boo** | | | **S Aps** | | | **S CrB** | | | **S UMi** | | | **R CrB** | | | **R CrB** | | |
| 143227 | | | *145971* | | | 151731 | | | 153378 | | | 154428 | | | 154428 | | |
| 639 | 11.4 | Ch | 658 | 10.8 | En | 680 | 10.3 | Wp | 681 | 12.2 | Jo | 634 | 6.0 | Pt | 652 | 6.0 | Ko |
| 646 | 11.8 | Ra | **RT Lib** | | | 680 | 10.3 | Sf | 682 | 12.0 | Jo | 635 | 6.2 | Si | 652 | 6.0 | Ar |
| 649 | 12.4 | Pt | *150018* | | | 680 | 10.1 | Ko | 685 | 12.8 | Kg | 635 | 6.0 | Cy | 652 | 6.1 | Af |
| 651 | 11.6 | Sp | 649 | 8.3 | Pt | 680 | 9.8 | Jo | 691 | 12.0 | Jo | 635 | 5.9 | Jo | 652 | 6.0 | Lf |
| 651 | 12.6 | Ch | 656 | 8.6 | Ch | 680 | 10.5 | Mn | | **T Nor** | | 635 | 6.9 | Ch | 652 | 6.0 | Pb |
| 655 | 12.6 | Wd | 679 | 9.1 | Pt | 680 | 10.0 | Wa | | *153654* | | 635 | 5.9 | Pt | 652 | 6.1 | Pk |
| 658 | 12.3 | Pk | **T Lib** | | | 682 | 10.0 | Ah | 621 | 7.3 | En | 636 | 6.0 | Pt | 652 | 6.2 | Si |
| 660 | 12.4 | Jo | *150519* | | | 686 | 9.2 | Jo | 624 | 6.9 | Ht | 636 | 6.2 | Si | 653 | 6.2 | Si |
| 667 | 12.0 | Ra | 651[ | 13.2 | Ch | 690 | 8.9 | Jo | 631 | 7.0 | Ht | 636 | 6.0 | Wd | 653 | 6.0 | Ra |
| 670 | 12.3 | Es | **Y Lib** | | | 690 | 8.8 | Wa | 636 | 7.3 | Ht | 636 | 5.8 | Jo | 653 | 6.0 | Pt |
| 679 | 12.3 | Pt | *150605* | | | 690 | 8.8 | Wp | 649 | 7.5 | En | 636 | 6.0 | Kg | 653 | 6.1 | Pk |
| 679 | 12.0 | Es | 651[ | 12.4 | Pk | 691 | 9.5 | Bs | 658 | 8.9 | En | 636 | 6.0 | Bc | 653 | 6.0 | Jo |
| 680 | 12.4 | Jo | **S Lib** | | | **RS Lib** | | | **RR CrB** | | | 636 | 6.0 | Cy | 653 | 6.0 | Kg |
| 686 | 11.7 | Jo | *151520* | | | *151822* | | | 153738 | | | 636 | 5.9 | Mn | 653 | 5.9 | Fr |
| 687 | 11.8 | Es | 649 | 8.3 | Pt | 621 | 10.6 | En | 635 | 8.0 | Lt | 637 | 6.0 | Jo | 653 | 6.1 | Pb |
| 691 | 11.5 | Jo | 651 | 8.5 | Ch | 624 | 11.2 | Ht | 642 | 7.8 | Lt | 637 | 6.0 | Cy | 653 | 6.1 | Lu |
| **S Lup** | | | 652 | 9.1 | Mw | 631 | 11.4 | Ht | 648 | 7.8 | Lt | 637 | 6.2 | Si | 653 | 6.0 | Ko |
| *144646a* | | | **S Ser** | | | 636 | 11.6 | Ht | 653 | 8.0 | Lt | 637 | 6.0 | Pt | 653 | 6.2 | Kp |
| 624 | 12.3 | Ht | 151714 | | | 646 | 12.1 | Bl | 659 | 8.0 | Lt | 638 | 6.0 | Pt | 653 | 6.0 | Rb |
| 631 | 12.0 | Ht | 649 | 11.9 | Pt | 651 | 12.4 | Ch | 665 | 8.0 | Lt | 638 | 6.3 | Hr | 653 | 6.0 | Ar |
| 636 | 12.1 | Ht | 653 | 11.8 | Ra | 653 | 11.7 | En | 687 | 8.1 | Lt | 638 | 6.1 | Si | 653 | 6.0 | Af |
| 649 | 12.1 | En | 655 | 11.8 | Jo | 660 | 12.0 | En | | **R CrB** | | 638 | 6.0 | Kg | 654 | 6.0 | Lu |
| 658 | 11.7 | En | 656 | 11.6 | Ch | **RU Lib** | | | | 154428 | | 640 | 6.0 | Jo | 654 | 6.0 | Ko |
| **X Lup** | | | 661 | 11.7 | Jo | *152714* | | | 502 | 6.1 | Mg | 640 | 6.2 | Si | 654 | 6.1 | Kp |
| *144646b* | | | 666 | 11.5 | Wu | 629 | 8.5 | Ra | 532 | 6.3 | Kd | 640 | 5.9 | Ra | 654 | 6.0 | Rb |
| 624[ | 12.1 | Ht | 667 | 11.0 | Jo | 633 | 8.6 | Hl | 536 | 6.2 | Mg | 641 | 6.2 | Si | 654 | 6.1 | Sz |
| 658[ | 12.1 | En | 677 | 11.4 | Ma | 649 | 10.1 | Pt | 537 | 6.3 | Mg | 641 | 6.0 | Jo | 654 | 6.1 | Cy |
| **U Boo** | | | 679 | 11.0 | Pt | 650 | 9.7 | Hl | 538 | 6.3 | Mg | 642 | 6.0 | Jo | 654 | 6.2 | Fi |
| 144918 | | | 680 | 11.5 | Kn | 652 | 9.7 | Mw | 564 | 6.1 | Kd | 642 | 6.0 | Kg | 654 | 6.2 | Se |
| 566 | 11.0 | Fn | 680 | 11.0 | Jo | 656 | 9.4 | Ch | 590 | 6.1 | Mg | 642 | 6.0 | Bc | 654 | 6.1 | Pk |
| 575 | 11.0 | Fn | 682 | 10.6 | Jo | 679 | 11.0 | Pt | 593 | 6.3 | Kd | 642 | 5.9 | Rc | 654 | 6.2 | Si |
| 601 | 10.9 | Fn | 682 | 11.5 | Md | 689 | 12.0 | Ra | 596 | 6.2 | Kd | 642 | 6.2 | Si | 654 | 6.0 | Pt |
| 628 | 11.2 | Fn | 683 | 11.4 | Kn | **R Nor** | | | 604 | 6.2 | Kd | 643 | 6.1 | Cy | 655 | 6.2 | Se |
| 634 | 11.4 | Fn | 685 | 11.2 | Ra | *153840* | | | 607 | 6.2 | Si | 646 | 6.2 | Si | 655 | 5.9 | Mn |
| 636 | 12.1 | Cy | 686 | 10.4 | Jo | 621 | 12.4 | En | 608 | 6.3 | Si | 646 | 6.0 | Ra | 655 | 5.9 | Jo |
| 649 | 11.5 | Fn | 690 | 10.0 | Jo | 624 | 12.4 | Ht | 611 | 6.2 | Si | 647 | 6.3 | Si | 655 | 6.1 | Lf |
| 658 | 12.3 | Cy | **S CrB** | | | 631 | 11.8 | Ht | 613 | 6.0 | Kd | 648 | 6.1 | Ch | 655 | 6.2 | Pb |
| 660 | 12.3 | Jo | 151731 | | | 636 | 11.5 | Ht | 619 | 6.2 | Si | 648 | 6.2 | Si | 655 | 6.1 | Tr |
| 667 | 11.6 | Jo | 629 | 12.4 | Ra | 646 | 10.9 | Bl | 619 | 5.9 | Mn | 649 | 6.0 | Jo | 655 | 6.0 | Wd |
| 678 | 11.1 | Cl | 636 | 12.5 | Jo | 649 | 10.6 | En | 620 | 6.2 | Si | 649 | 6.2 | Si | 655 | 6.3 | Hr |
| 680 | 11.5 | Jo | 649 | 12.0 | Pt | 658 | 9.9 | En | 621 | 6.2 | Si | 649 | 6.1 | Pt | 655 | 6.0 | Lu |
| **Y Lup** | | | 653 | 12.5 | Ko | **W Lib** | | | 622 | 6.2 | Si | 649 | 6.0 | Kg | 655 | 6.1 | Kp |
| *145254* | | | 655 | 12.5 | Wd | *153215* | | | 622 | 6.2 | Kd | 649 | 5.9 | Mn | 655 | 6.0 | Rb |
| 629[ | 12.8 | Ht | 655 | 12.3 | Jo | 656[ | 13.4 | Ch | 623 | 6.0 | Cy | 649 | 6.2 | Fi | 655 | 6.3 | Ar |
| 634[ | 12.8 | Bl | 656 | 12.1 | Ch | **S UMi** | | | 623 | 6.2 | Si | 650 | 6.0 | Cy | 655 | 6.2 | Af |
| 658[ | 13.7 | En | 660 | 12.0 | Jo | 153378 | | | 624 | 6.1 | Si | 650 | 5.2 | Fi | 656 | 6.0 | Ch |
| **S Aps** | | | 660 | 12.9 | Bs | 635 | 11.4 | Jo | 625 | 6.1 | Cy | 650 | 6.0 | Rc | 656 | 6.3 | Hr |
| *145971* | | | 663 | 11.6 | Ch | 641 | 11.4 | Jo | 626 | 6.1 | Cy | 650 | 5.9 | Pt | 656 | 6.1 | Kp |
| 624 | 10.0 | Ht | 666 | 12.0 | Ra | 641 | 11.5 | Ch | 626 | 6.4 | Kd | 650 | 6.0 | Ba | 656 | 6.0 | Rb |
| 631 | 10.1 | Ht | 667 | 10.7 | Bc | 646 | 12.2 | Ra | 626 | 6.2 | Si | 651 | 6.2 | Si | 656 | 6.0 | Sq |
| 634 | 10.0 | Bl | 667 | 11.8 | Wp | 649 | 11.3 | Pt | 627 | 6.2 | Si | 651 | 6.1 | Pk | 656 | 6.2 | Se |
| 636 | 10.3 | Ht | 667 | 11.8 | Jo | 651 | 10.8 | Kp | 629 | 5.9 | Mn | 651 | 6.0 | Kg | 656 | 6.1 | Pb |
| 638 | 10.1 | En | 667 | 11.7 | Wa | 653 | 10.8 | Kp | 629 | 6.4 | Kd | 651 | 5.9 | Lf | 656 | 6.0 | Jo |
| 639 | 10.4 | Sl | 670 | 11.4 | Wd | 655 | 10.9 | Kp | 629 | 6.0 | Ra | 651 | 6.1 | Pb | 656 | 6.0 | Kg |
| 646 | 10.1 | Bl | 671 | 11.5 | Wa | 655 | 11.5 | Jo | 631 | 6.3 | Si | 651 | 6.1 | Kp | 656 | 5.8 | Mc |
| 648 | 10.6 | Sl | 679 | 10.5 | Pt | 655 | 12.3 | Wd | 633 | 6.3 | Si | 651 | 6.0 | Rb | 656 | 6.0 | Ra |
| 649 | 10.1 | En | 679 | 10.0 | Jo | 661 | 11.8 | Jo | 634 | 6.0 | Cy | 651 | 5.9 | Ar | 657 | 6.2 | Se |
| 654 | 10.6 | En | 679 | 10.6 | Wp | 679 | 11.8 | Pt | 634 | 6.2 | Si | 652 | 6.3 | Hr | 657 | 6.1 | Pk |

## Variable Star Observations Received During September, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R CrB 154428 | | | | | | | | | | | | | | | V CrB 154639 | | |
| 657 | 6.2 | Lf | 664 | 6.0 | Ch | 670 | 6.0 | Ar | 677 | 6.0 | Wa | 684 | 6.0 | Mc | 641 | 7.4 | Jo |
| 657 | 6.3 | Tr | 664 | 6.1 | Lu | 670 | 6.0 | Af | 677 | 6.0 | Ba | 685 | 6.0 | Ra | 648 | 8.2 | Hi |
| 657 | 6.3 | Hr | 664 | 5.9 | Ko | 670 | 6.0 | Gw | 677 | 6.1 | Hf | 685 | 6.2 | Wp | 650 | 6.9 | Pt |
| 657 | 6.0 | Lu | 664 | 6.1 | Pb | 670 | 6.0 | Lf | 677 | 6.0 | Lu | 685 | 6.0 | Pt | 650 | 7.7 | Cy |
| 657 | 6.1 | Sx | 664 | 5.8 | Pt | 670 | 6.1 | Pb | 677 | 6.0 | Ko | 685 | 6.0 | Wa | 653 | 7.6 | Ra |
| 657 | 6.0 | Kp | 664 | 6.1 | Pk | 670 | 6.0 | Tr | 677 | 5.8 | Kp | 685 | 6.1 | Hf | 653 | 7.5 | Jo |
| 657 | 6.0 | Rb | 664 | 6.2 | Wa | 670 | 6.0 | Jo | 677 | 6.0 | Lf | 685 | 6.1 | Sx | 654 | 7.7 | So |
| 658 | 6.0 | Rb | 664 | 5.9 | Kg | 670 | 6.0 | Kg | 677 | 6.0 | Pb | 686 | 5.8 | Jo | 656 | 7.2 | Jo |
| 658 | 6.1 | Ar | 665 | 5.9 | Ko | 671 | 6.1 | Bc | 677 | 5.9 | Pt | 687 | 6.0 | Mc | 656 | 7.5 | Es |
| 658 | 6.2 | Af | 665 | 6.1 | Pb | 671 | 6.0 | Rb | 678 | 6.1 | Gw | 687 | 6.0 | Sx | 656 | 7.4 | Sq |
| 658 | 6.2 | Lf | 665 | 6.1 | Mw | 671 | 6.3 | Ar | 678 | 6.2 | Wp | 689 | 6.0 | Ra | 656 | 7.5 | Ch |
| 658 | 6.1 | Pb | 666 | 6.0 | Ar | 671 | 6.1 | Af | 678 | 6.1 | Ar | 689 | 6.0 | Rc | 656 | 8.1 | Mc |
| 658 | 6.1 | Cy | 666 | 6.0 | Af | 671 | 6.1 | Fr | 678 | 6.0 | Dh | 690 | 6.0 | Jo | 658 | 7.7 | Pk |
| 658 | 6.2 | Se | 666 | 6.0 | Fr | 671 | 6.0 | Lf | 678 | 6.0 | Hk | 690 | 6.0 | Pt | 660 | 7.9 | Mc |
| 658 | 6.1 | Pk | 666 | 6.0 | Lf | 671 | 6.3 | Pb | 678 | 6.0 | Lf | 690 | 6.0 | Wa | 660 | 7.3 | Jo |
| 658 | 6.0 | Kg | 666 | 6.0 | Ra | 671 | 6.1 | Tr | 678 | 6.1 | Pb | 691 | 6.0 | Ba | 663 | 7.6 | Md |
| 658 | 6.2 | Lr | 666 | 6.0 | Pb | 671 | 6.0 | Jo | 678 | 6.1 | Tr | 691 | 6.1 | Gy | 667 | 7.5 | Jo |
| 658 | 6.0 | Ba | 666 | 6.3 | Tr | 671 | 6.0 | Kg | 678 | 6.1 | Cy | 691 | 6.2 | Wd | 667 | 7.8 | Bc |
| 658 | 6.9 | Pt | 666 | 5.9 | Pt | 671 | 6.0 | Wa | 678 | 6.1 | Pk | 691 | 5.8 | Pt | 669 | 7.3 | Es |
| 659 | 6.1 | Pk | 666 | 6.1 | Pk | 672 | 6.2 | Bc | 678 | 6.0 | Wa | 691 | 5.8 | Jo | 670 | 7.3 | Jo |
| 659 | 6.0 | Jo | 667 | 6.0 | Wd | 672 | 6.2 | Wp | 679 | 6.1 | Wd | 692 | 6.0 | Pt | 672 | 7.5 | Md |
| 659 | 5.9 | Ar | 667 | 6.0 | Bc | 672 | 6.0 | Ar | 679 | 6.0 | Bc | 692 | 6.1 | Mc | 675 | 7.3 | Sq |
| 659 | 6.0 | Af | 667 | 6.0 | Lu | 672 | 6.0 | Af | 679 | 6.0 | Rb | 693 | 6.0 | Kg | 676 | 7.0 | Hi |
| 659 | 6.1 | Fr | 667 | 6.0 | Wp | 672 | 6.0 | Lf | 679 | 6.1 | Ar | 693 | 5.9 | Pt | 677 | 7.5 | Hf |
| 659 | 6.1 | Lf | 667 | 6.1 | Rb | 672 | 6.2 | Pb | 679 | 6.1 | Dh | 696 | 6.5 | Hz | 677 | 7.4 | Es |
| 659 | 6.1 | Pb | 667 | 6.0 | Ar | 672 | 6.2 | Fi | 679 | 6.1 | Pb | 696 | 6.2 | Lr | 678 | 7.5 | Mc |
| 660 | 6.0 | Ar | 667 | 6.0 | Af | 672 | 6.0 | Wa | 679 | 6.0 | Jo | X CrB 154536 | | | 679 | 6.8 | Pt |
| 660 | 6.0 | Af | 667 | 6.1 | Gw | 674 | 6.1 | Bc | 679 | 6.0 | Pt | | | | 679 | 7.3 | Jo |
| 660 | 6.1 | Fr | 667 | 6.0 | Pb | 674 | 5.9 | Ar | 679 | 6.1 | Se | 626 | 12.8 | Hi | 681 | 7.5 | Cy |
| 660 | 6.1 | Pb | 667 | 6.1 | Tr | 674 | 5.9 | Af | 679 | 6.1 | Pk | 650 | 13.5 | Hi | 682 | 7.9 | Cm |
| 660 | 6.1 | Pk | 667 | 6.0 | Jo | 674 | 6.0 | Gw | 679 | 6.1 | Lf | 656 | 13.5 | Ch | 682 | 7.4 | Md |
| 660 | 6.0 | Jo | 667 | 6.0 | Kg | 674 | 6.0 | Fr | 679 | 6.0 | Wa | 679 | 12.9 | Pt | 684 | 7.6 | Mc |
| 660 | 6.0 | Mc | 667 | 5.9 | Pt | 674 | 6.0 | Lf | 679 | 6.0 | Ba | R Ser 154615 | | | 685 | 7.5 | Hf |
| 660 | 6.0 | Pt | 667 | 6.2 | Se | 674 | 5.9 | Pb | 680 | 5.9 | Ko | | | | 686 | 7.9 | Es |
| 661 | 6.0 | Pt | 667 | 5.9 | Mn | 674 | 5.9 | Tr | 680 | 6.0 | Rb | 637 | 12.5 | Jo | 686 | 7.2 | Jo |
| 661 | 6.0 | Rb | 667 | 6.1 | Pk | 674 | 6.1 | Pk | 680 | 6.1 | Ar | 650 | 12.5 | Pt | 690 | 7.5 | So |
| 661 | 6.0 | Pb | 667 | 6.0 | Wa | 674 | 5.9 | Dh | 680 | 6.0 | Dh | 656 | 12.0 | Ch | 691 | 7.4 | Jo |
| 661 | 6.0 | Pk | 667 | 6.0 | Ba | 674 | 6.0 | Ah | 680 | 6.1 | Lf | 658 | 11.8 | Es | 692 | 7.5 | Mc |
| 661 | 5.8 | Jo | 667 | 6.0 | Ra | 675 | 6.0 | Bc | 680 | 6.0 | Cy | 661 | 11.8 | Jo | R Lib *154715* | | |
| 661 | 6.0 | Rc | 668 | 6.1 | Pk | 675 | 6.0 | Ar | 680 | 6.0 | Jo | 663 | 11.4 | Md | | | |
| 662 | 6.0 | Bc | 668 | 5.9 | Ko | 675 | 6.0 | Af | 680 | 6.1 | Pt | 666 | 11.6 | Wu | 636 | 9.9 | Jo |
| 662 | 6.0 | Ar | 668 | 5.9 | Rc | 675 | 6.0 | Dh | 680 | 6.0 | Wa | 668 | 11.1 | Es | 652 | 11.4 | Mw |
| 662 | 6.1 | Af | 668 | 5.8 | Jo | 675 | 6.2 | Gw | 680 | 5.9 | Mn | 677 | 10.5 | Es | 656 | 11.2 | Ch |
| 662 | 6.0 | Fr | 669 | 6.0 | Bc | 675 | 6.0 | Fr | 680 | 6.0 | Lu | 679 | 11.2 | Md | 660 | 11.5 | Bs |
| 662 | 6.0 | Lf | 669 | 6.2 | Wp | 675 | 6.0 | Hk | 680 | 6.2 | Wp | 679 | 11.1 | Pt | R Lup *154736* | | |
| 662 | 6.0 | Pb | 669 | 6.0 | Rb | 675 | 6.0 | Lf | 681 | 6.0 | Ko | 679 | 10.5 | Es | | | |
| 662 | 6.0 | Hu | 669 | 6.1 | Ar | 675 | 6.0 | Pb | 681 | 6.0 | Rb | 681 | 10.9 | Jo | 621 | 9.8 | En |
| 662 | 6.1 | Tr | 669 | 6.0 | Af | 675 | 6.0 | Tr | 681 | 6.0 | Lf | 682 | 10.7 | Jo | 624 | 10.0 | Sp |
| 662 | 6.1 | Pk | 669 | 6.0 | Fr | 676 | 6.0 | Ko | 681 | 6.0 | Cy | 682 | 11.2 | Md | 648 | 9.9 | Sl |
| 663 | 5.9 | Pt | 669 | 6.1 | Lf | 676 | 6.0 | Rb | 681 | 5.8 | Jo | 686 | 11.0 | Es | 652 | 10.1 | Sp |
| 663 | 6.0 | Bc | 669 | 6.1 | Pb | 676 | 6.0 | Ar | 681 | 6.0 | Wa | 686 | 10.5 | Jo | 660 | 10.2 | En |
| 663 | 6.3 | Hr | 669 | 6.0 | Tr | 676 | 6.0 | Lf | 682 | 6.0 | Wa | 690 | 10.5 | Jo | RR Lib *155018* | | |
| 663 | 6.1 | Ar | 669 | 5.9 | Jo | 676 | 6.0 | Rb | 682 | 6.1 | Ah | V CrB 154639 | | | | | |
| 663 | 6.0 | Af | 669 | 6.0 | Wa | 676 | 6.0 | Tr | 682 | 5.8 | Jo | | | | 650 | 11.7 | Pt |
| 663 | 6.0 | Lf | 669 | 6.1 | Hf | 676 | 5.9 | Rc | 683 | 6.1 | Cy | 626 | 8.8 | Hi | 652 | 12.1 | Mw |
| 663 | 6.1 | Pb | 670 | 6.3 | Hr | 676 | 6.0 | Wa | 683 | 6.0 | Jo | 635 | 7.6 | Jo | 656 | 11.9 | Ch |
| 663 | 6.0 | Tr | 670 | 6.2 | Wp | 677 | 6.4 | Hs | 683 | 6.0 | Wa | 636 | 8.4 | Cy | 679 | 10.9 | Pt |
| 663 | 6.2 | Pk | 670 | 6.0 | Rb | 677 | 6.0 | Se | 683 | 6.0 | Hf | 640 | 8.5 | Hi | | | |

## Variable Star Observations Received During September, 1934.

| J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. |
|---|---|---|---|---|---|
| Z CrB | R Her | SX Her | W CrB | U Her | W Her |
| 155229 | 160118 | 160325 | 161138 | 162119 | 163137 |
| 666[12.8 Wu | 677 10.6 Ko | 668 8.4 Ko | 653 11.7 Pt | 662 11.1 Hu | 662 8.4 Ar |
| 679 12.6 Es | 677 10.6 Sf | 670 8.4 Wd | 657 11.5 Md | 667 10.6 Jo | 662 8.2 Fr |
| T CrB | 679 11.4 Wd | 676 8.2 Ko | 661 11.8 Jo | 667 10.9 Gw | 662 8.4 Lf |
| 155526 | 679 10.7 Pt | 677 8.2 Ko | 667 10.8 Md | 668 11.2 Wd | 662 8.4 Pb |
| 634 9.8 Pt | 680 11.7 Jo | 677 8.4 Pt | 667 11.0 Jo | 670 11.1 Gw | 663 8.3 Bc |
| 649 9.9 Pt | 680 11.0 Hf | 677 8.4 Hf | 667 10.9 Ra | 675 11.0 Gw | 663 8.4 Lf |
| 658 9.8 Pt | 683 11.1 Kn | 678 8.0 Sq | 675 10.2 Md | 676 11.1 Hi | 663 8.4 Tr |
| 667 9.8 Pt | 685 10.9 Sf | 678 8.1 Pt | 677 9.9 Es | 677 11.2 Wd | 666 8.4 Ar |
| 677 9.9 Pt | 689 11.3 Ra | 679 8.1 Pt | 679 10.1 Md | 677 11.0 Fs | 666 8.4 Fr |
| RZ Sco | U Ser | 679 8.4 Wd | 680 9.9 Jo | 678 11.1 Gw | 666 8.4 Lf |
| *155823* | 160210 | 680 8.3 Ko | 680 10.0 Pt | 679 11.8 Jo | 666 8.4 Pb |
| 621 11.6 En | 629 10.7 Ra | 680 8.3 Jo | 680 10.6 Wa | 680 11.1 Pt | 667 8.3 Gw |
| 624 11.7 Ht | 633 11.2 Hl | 680 8.2 Pt | 682 10.1 Es | g Her | 667 8.3 Jo |
| 631 11.5 Ht | 636 11.4 Cy | 682 8.5 Jo | 682 9.9 Jo | 162542 | 669 8.3 Fr |
| 636 10.9 Ht | 639 11.7 My | 684 8.3 Mc | 686 9.4 Jo | 635 5.2 Lt | 669 8.2 Lf |
| 637 11.0 Jo | 650 12.2 Pt | 685 8.0 Pt | 690 9.4 Wa | 642 4.8 Lt | 669 8.2 Pb |
| 650 9.5 Pt | 651 11.5 Wh | 685 8.4 Hf | 691 9.8 Cm | 653 4.9 Lt | 670 8.4 Wd |
| 652 9.1 Mw | 655 12.6 Wd | 686 8.5 Jo | 691 9.3 Jo | 665 5.2 Lt | 670 8.4 Gw |
| 653 9.1 En | 660 12.8 My | 687 8.1 Lt | W Oph | 687 5.0 Lt | 670 8.5 Lf |
| 660 8.5 En | 665 12.9 My | 689 8.4 Ra | *161607* | SS Her | 671 8.4 Ar |
| 661 8.7 Kn | 680 13.9 Wa | 690 8.1 Pt | 650[13.7 Ch | 162807 | 671 8.4 Af |
| 667 8.3 Kn | 680 13.8 Wp | 691 8.2 Pt | 680[12.5 Pt | 650 11.4 Cy | 671 8.4 Fr |
| 680 8.1 Kn | 685 13.5 My | 691 8.3 Gy | V Oph | 653 11.6 Ra | 671 8.4 Lf |
| 683 8.3 Kn | SX Her | 692 8.6 Mc | *162112* | 653 11.9 Pt | 671 8.5 Pb |
| 691 8.5 BH | 160325 | 692 8.3 Pt | 629 9.8 Ra | 659 12.0 Jo | 671 8.3 Tr |
| Z Sco | 629 8.3 Ra | 693 8.6 Pt | 635 8.8 Jo | 660 11.5 Bs | 671 8.2 Kn |
| *160021* | 634 8.0 Pt | W Sco | 642 9.0 Jo | 667 9.9 Jo | 672 8.4 Af |
| 621 9.5 En | 635 8.0 Pt | *160519* | 649 9.0 Jo | 669 9.9 Bc | 672 8.4 Lf |
| 624 9.2 Ht | 635 8.5 Lt | 634 11.9 Bl | 650 10.0 Ch | 677 9.6 Sf | 674 8.4 Ar |
| 631 9.2 Ht | 636 8.2 Pt | RU Her | 653 9.2 Jo | 679 9.5 Jo | 674 8.4 Af |
| 635 9.3 Rc | 637 8.0 Pt | 160625 | 653 10.2 Pt | 680 9.1 Hf | 674 8.4 Gw |
| 636 9.3 Ht | 638 8.0 Pt | 629 12.4 Ra | 656 9.3 Jo | 680 9.8 Pt | 674 8.4 Fr |
| 637 9.0 Jo | 640 8.2 Jo | 650 13.0 Pt | 667 10.0 Jo | 682 9.4 Jo | 674 8.4 Hk |
| 649 9.2 Rc | 641 8.1 Wd | 655 12.9 Wd | 680 9.8 Jo | 685 9.6 Sf | 674 8.3 Lf |
| 653 9.2 Jo | 648 8.0 Lt | 655 13.0 Ar | 680 9.9 Pt | 685 9.6 Hf | 674 8.4 Pb |
| 653 9.5 En | 649 8.0 Pt | 660 13.4 Bs | 680 10.3 Kn | 686 9.5 Jo | 674 8.4 Tr |
| 659 9.4 Rc | 650 8.0 Pt | 677 13.6 Ma | U Her | 689 9.2 Ra | 675 8.4 Ar |
| 660 9.6 En | 651 7.8 Mc | 679 13.4 Pt | 162119 | 691 9.9 Jo | 675 8.4 Af |
| 674 9.8 Gw | 653 8.0 Pt | R Sco | 691 9.9 Jo | 693 9.7 Wd | 675 8.3 Gw |
| 678 9.5 Rc | 653 8.1 Jo | *161122a* | 629 10.3 Ra | W Her | 675 8.4 Fr |
| 682 9.6 Rc | 653 8.1 Ko | 631 12.6 Ht | 629 10.6 Hi | 163137 | 675 8.4 Hk |
| 692 9.7 Rc | 654 8.2 Ko | 634 12.6 Bl | 635 9.9 Jo | 675 9.3 Hl | 675 8.4 Lf |
| R Her | 654 8.0 Pt | 636 12.5 Ht | 636 10.8 Wd | 633 9.7 Jo | 675 8.4 Pb |
| 160118 | 655 8.3 Wd | 653 12.0 Pt | 640 10.3 Jo | 636 9.5 Jo | 676 8.2 Ko |
| 629 8.2 Ra | 656 8.0 Mc | 653 11.6 Ra | 640 10.8 Hi | 640 9.1 Wd | 676 8.4 Lf |
| 635 8.7 Jo | 656 7.5 Sq | 653 11.6 En | 648 10.7 Hi | 642 8.7 Hl | 677 8.5 Sf |
| 640 9.1 Jo | 657 8.0 Sx | 660 11.6 En | 650 10.9 Cy | 650 8.7 Lt | 677 8.4 Ma |
| 650 9.3 Pt | 658 8.2 Pt | 680 11.4 Pt | 651 10.8 Kp | 652 8.7 Pt | 678 8.4 Gw |
| 650 9.6 Cy | 660 8.1 Pt | 680 11.8 Wp | 653 10.8 Kp | 653 8.5 Jo | 678 8.5 Lf |
| 651 9.5 Wd | 660 7.9 Mc | S Sco | 653 10.6 Pt | 653 8.5 Fr | 679 8.4 Lf |
| 653 9.5 Jo | 661 8.1 Pt | *161122b* | 653 10.4 Jo | 654 8.5 Ko | 679 8.4 Af |
| 658 9.8 Cy | 661 8.2 Jo | 621 12.8 En | 655 11.1 Kp | 658 8.4 Lf | 679 8.4 Dh |
| 659 9.7 Es | 663 8.1 Pt | 634 12.6 Bl | 655 10.7 Dl | 659 8.4 Jo | 679 8.4 Jo |
| 661 9.8 Jo | 664 8.3 Sq | 653[12.8 En | 656 10.5 Jo | 660 8.4 Ar | 680 8.4 Pt |
| 661 9.8 Kn | 665 8.1 Lt | 660[12.8 En | 657 11.3 Pk | 660 8.4 Fr | 680 8.5 Lf |
| 667 10.0 Jo | 667 8.4 Jo | 680[13.2 Wp | 657 10.9 Dl | 660 8.4 Pb | 681 8.4 Lf |
| 668 10.0 Wd | 667 8.1 Pt | | 658 10.9 Cy | 660 8.4 Jo | 682 8.2 Jo |
| 670 10.0 Jo | 668 8.2 Pt | | 660 10.8 Jo | 661 8.4 Jo | 685 8.5 Hf |
| | | | 662 11.1 Pb | 662 8.2 Hu | |

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. |
|---|---|---|---|---|---|
| W HER | RR OPH | RR SCO | R OPH | Z OPH | RT SER |
| 163137 | *164319* | *165030a* | *170215* | *171401* | *173411* |
| 686 8.3 Jo | 654 9.7 Ko | 636 9.1 Ht | 654 8.4 Pt | 679 8.4 Wa | 692 10.5 Mc |
| 686 8.1 Kn | 655 9.9 Wd | 639 8.7 Sl | 655 8.4 Hh | 679 9.1 Wp | RU SCO |
| 690 8.5 Sx | 660 9.2 En | 648 9.3 Sl | 656 7.9 Jo | 680 8.6 Pt | *173543* |
| 691 8.5 Jo | 661 9.5 Kn | 652 10.3 Sp | 656 8.5 Mc | 680 8.6 Jo | 621 11.2 En |
| 691 8.4 Cm | 677 9.4 Hf | 654 10.6 En | 660 8.2 Wh | 681 9.1 Wd | 654 11.0 En |
| R UMI | 677 8.9 Ko | 660 10.8 En | 660 9.0 Mc | 683 8.6 Jo | 660 11.5 En |
| 163172 | 680 9.0 Pt | SS OPH | 661 8.2 Jo | 685 9.5 Kg | SV SCO |
| 635 9.7 Jo | 681 8.8 Jo | *165202* | 661 8.4 Rc | 685 9.1 Hf | *174135* |
| 640 10.2 Ra | 682 8.7 Jo | 629 12.2 Hi | 663 8.9 Ru | 689 9.1 Ra | 621[12.2 En |
| 641 10.4 Wd | 682 9.1 Kn | 650 13.3 Hi | 664 8.9 Sq | 690 8.7 Jo | 660[12.2 En |
| 642 9.9 Jo | 685 9.3 Hf | 658 12.0 Sp | 667 8.7 Gw | RS HER | W PAV |
| 649 10.0 Jo | 686 9.2 Kn | 687[13.5 Es | 667 9.3 Ra | 171723 | *174162* |
| 653 10.2 Jo | 690 8.7 Jo | RV HER | 667 8.9 Jo | 628 9.1 Hi | 621 10.9 En |
| 661 10.5 Jo | S HER | 165631 | 670 8.9 Gw | 634 9.4 So | 623 10.5 Ht |
| 667 10.5 Ra | 164715 | 634 13.7 So | 670 9.2 Wd | 636 9.2 Jo | 629 10.3 Ht |
| 667 10.3 Jo | 639 12.6 My | 653 11.9 Pf | 670 8.8 Hh | 640 9.6 Jo | 634 10.2 Ht |
| 677 10.5 Sq | 649 12.0 Jo | 654 11.9 So | 674 9.3 Gw | 653 10.8 Jo | 654 9.9 En |
| 677 10.5 Wd | 653 11.8 Jo | 654 11.7 Pt | 675 9.3 Gw | 654 11.1 Pt | U ARA |
| 679 10.3 Hf | 654 11.4 Pt | 655 11.5 Jo | 678 9.3 Gw | 654 10.5 So | *174551* |
| 680 10.0 Jo | 655 11.6 Jo | 655 11.5 Ar | 678 9.0 Rc | 657 11.0 Md | 629 13.0 Ht |
| 685 10.5 Hf | 659 11.5 Jo | 659 11.3 Jo | 679 9.4 Rc | 659 11.5 Jo | 634 12.8 Ht |
| 686 10.2 Jo | 660 10.7 My | 661 11.2 Jo | 679 9.5 Sq | 663 11.6 So | 654 9.3 En |
| 691 10.1 Jo | 660 10.5 Bs | 663 10.7 Md | 679 9.4 Kn | 667 11.8 Md | RT OPH |
| R DRA | 661 10.9 Jo | 663 10.8 So | 680 9.2 Jo | 677 12.3 Wp | 175111 |
| 163266 | 664 10.5 Sq | 669 10.4 Pf | 680 9.5 Pt | 678 12.6 Hi | 654[12.5 Pt |
| 620 9.3 Mn | 665 10.5 My | 675 10.4 Md | 682 9.2 Rc | 678 12.5 So | 680[12.5 Pt |
| 630 9.9 Mn | 667 10.5 Jo | 676 10.0 Ar | 683 9.5 Jo | 678 12.5 Wa | T DRA |
| 635 9.8 Jo | 668 10.5 Wd | 676 10.0 Lf | 683 9.5 Mc | 680 12.3 Pt | *175458a* |
| 638 10.0 Mn | 670 10.4 Jo | 676 9.9 Pb | 689 9.7 Rc | 686 13.0 So | 636 10.1 Cy |
| 640 10.4 Ra | 677 9.7 Hf | 676 9.8 Tr | 690 9.9 Jo | 686 12.6 Es | 683 11.0 Cy |
| 641 10.9 Wd | 679 9.8 Wa | 678 10.5 So | 692 9.2 Mc | 690 12.7 So | UY DRA |
| 641 10.8 Ch | 679 9.6 Wp | 680 9.9 Jo | RT HER | S OCT | *175458b* |
| 642 10.6 Jo | 680 9.8 Pt | 680 9.9 Pt | 170627 | *172486* | 636 9.9 Cy |
| 648 11.2 Ch | 680 10.1 Wa | 682 10.3 Md | 660[13.4 Bs | 620 12.8 En | 683 10.4 Cy |
| 649 11.0 Jo | 680 9.5 Cm | 682 10.0 Jo | 669[14.3 Pf | 624 13.0 Ht | RY HER |
| 649 10.5 Mn | 682 9.7 Ah | 686 10.0 Jo | 680 12.7 Pt | 631 13.0 Ht | 175519 |
| 653 11.1 Pt | 682 9.9 Jo | 686 10.9 So | RW SCO | 636 13.0 Ht | 654 11.8 Pt |
| 653 11.5 Jo | 685 9.6 Hf | 690 10.4 So | *170833* | 658[12.8 En | 657 11.7 Md |
| 655 10.7 Mn | 685 9.7 My | 691 10.1 Jo | 621 12.5 En | RU OPH | 660 11.7 Bs |
| 661 12.2 Jo | 686 9.9 Jo | RT SCO | 660[12.5 En | 172809 | 660 11.6 Jo |
| 664 11.5 Ch | 691 9.7 Jo | *165636* | Z OPH | 654 11.5 Pt | 667 11.3 Md |
| 667 12.0 Ra | 693 9.6 My | 621 10.2 En | *171401* | 659 11.1 Es | 680 9.5 Jo |
| 667 12.4 Jo | RS SCO | 655 10.7 En | 633 8.4 Hl | 660 11.0 Bs | 680 10.2 Ma |
| 667 11.0 Mn | *164844* | 660 11.6 En | 635 7.8 Jo | 664 10.9 Wa | 680 10.1 Pt |
| 670 12.0 Wd | 621 11.6 En | R OPH | 640 8.3 Ra | 670 10.2 Jo | 681 9.6 Kn |
| 677 12.5 Wd | 624 11.9 Ht | *170215* | 642 7.9 Jo | 676 9.4 Wa | 682 10.3 Md |
| 680 12.5 Jo | 624 12.0 Sp | 633 7.8 Hl | 650 8.5 Hl | 677 9.4 Wa | 682 9.7 Jo |
| 680 11.9 Ma | 631 12.0 Ht | 635 8.4 Rc | 653 8.0 Jo | 678 9.5 Wa | 686 9.5 Jo |
| 680 12.0 Pt | 636 11.8 Ht | 635 7.8 Jo | 654 8.5 Pt | 679 9.6 Wa | 688 9.5 BH |
| 686 12.4 Jo | 652 11.7 Sp | 640 7.9 Ra | 656 7.9 Jo | 680 9.0 Pt | 691 9.3 Jo |
| 691 12.2 Gy | 653 11.2 En | 642 7.7 Jo | 661 8.2 Jo | 680 9.2 Ma | V DRA |
| RR OPH | 660 11.0 En | 649 8.2 Rc | 664 8.4 Wa | 680 9.5 Jo | 175654 |
| *164319* | RR SCO | 650 8.6 Hl | 667 8.6 Wa | 682 9.6 Md | 654 12.2 Pt |
| 621 11.5 En | *165030a* | 650 8.0 Ch | 667 8.8 Wp | 685 9.4 Es | 661 12.7 Wu |
| 651 10.0 Wd | 621 8.2 En | 651 8.4 Mc | 667 8.2 Jo | 686 8.9 Jo | 669 11.9 Es |
| 653 11.0 En | 624 8.1 Ht | 651 8.5 Wd | 670 8.2 Jo | 688 9.5 BH | 669 11.9 Es |
| 654 10.1 Sp | 624 9.0 Sp | 652 8.2 Sq | 677 9.0 Hf | 691 9.3 Gy | 680 11.4 Ie |
| 654 10.0 Pt | 631 9.0 Ht | 653 8.0 Jo | 678 8.4 Wa | | 680 11.5 Pt |

## Variable Star Observations Received During September, 1934.

| J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. |
|---|---|---|---|---|---|
| **V Dra** | **W Dra** | **W Lyr** | **X Oph** | **R Sct** | **R Sct** |
| 175654 | 180565 | 181136 | 183308 | *184205* | *184205* |
| 691 11.1 Gy | 654 10.2 Pt | 658 12.2 Kg | 655 8.8 Jo | 641 5.4 Jo | 655 5.7 Ar |
| **R Pav** | 655 9.5 Jo | 658 12.1 Lr | 661 8.7 Jo | 642 5.7 Kg | 655 5.6 Af |
| *180363* | 660 9.1 Md | 667 12.0 Jo | 661 8.9 Rc | 642 5.5 Bc | 655 5.8 Wd |
| 621 11.5 En | 661 9.6 Kn | 667 11.4 Wd | 666 8.7 Ra | 642 5.4 Jo | 655 5.4 Se |
| 623 12.0 Ht | 667 9.2 Wa | 668 11.5 Wd | 667 8.7 Jo | 647 5.3 Hr | 655 5.8 Mn |
| 629 12.2 Ht | 667 9.7 Pf | 677 11.0 Wd | 677 8.5 Ko | 648 5.5 Sl | 655 5.2 Jo |
| 634 12.3 Ht | 667 9.5 Wp | 677 10.6 Md | 678 9.0 Rc | 649 6.0 Rc | 656 5.3 Jo |
| 654 11.9 En | 670 9.6 Wp | 678 10.2 Wh | 680 8.3 Mn | 649 5.9 Pt | 656 5.4 Se |
| **T Her** | 672 8.9 Es | 679 10.4 So | 680 8.5 Jo | 649 5.2 Jo | 656 5.7 Kg |
| 180531 | 672 9.6 Wp | 679 10.7 Hf | 681 9.0 Kp | 649 5.8 Mn | 656 5.5 Mc |
| 635 10.3 Jo | 672 9.7 Fi | 680 10.2 Jo | 682 9.2 Rc | 650 5.2 Cy | 656 5.7 Pb |
| 640 9.7 Jo | 672 9.5 Wa | 682 9.9 Ah | 688 8.6 BH | 650 5.7 Ba | 656 5.4 Hr |
| 646 9.3 Ra | 676 9.2 Wa | 682 10.5 Md | 689 8.4 Cy | 650 6.1 Wh | 656 5.8 Kp |
| 650 9.0 Ba | 678 9.3 Wa | 685 10.4 Hf | 690 8.5 Pt | 650 5.9 Pt | 656 5.9 Rb |
| 651 8.5 Wd | 679 9.3 Wa | 685 10.3 Ra | 690 8.4 Sx | 651 5.6 Lf | 657 5.5 Lf |
| 653 8.2 Jo | 679 9.6 Wp | 686 10.2 So | 691 8.5 Jo | 651 5.4 Pb | 657 5.4 Tr |
| 654 8.6 Pt | 679 9.6 Pf | 686 10.0 Jo | 692 9.0 Rc | 651 5.7 Ch | 657 5.2 Lu |
| 656 7.4 Se | 679 9.5 Jo | 689 9.6 Cy | **RY Lyr** | 651 5.8 Kp | 657 5.7 Sx |
| 657 8.4 Sx | 680 9.6 Pt | 690 9.9 Sx | 184134 | 651 5.8 Rb | 657 5.8 Kp |
| 658 8.4 Ba | 680 9.4 Wa | 690 9.6 Pt | 634 14.1 So | 651 5.4 Ar | 657 5.9 Rb |
| 661 8.0 Wh | 681 9.5 Wa | 690 9.9 So | 653 13.5 Pf | 651 5.7 Kg | 657 5.4 Se |
| 661 8.3 Jo | 681 9.2 Es | 691 10.0 Jo | 669 13.7 Pf | 651 5.5 Mc | 658 5.6 Lf |
| 663 8.4 Bc | 682 9.5 Wp | 691 9.9 Wd | 678 13.3 So | 651 5.9 Wd | 658 5.5 Pb |
| 663 8.2 Ru | 682 9.6 Kn | **RV Sgr** | 679 13.7 Ie | 652 5.6 Lf | 658 5.5 Tr |
| 664 8.0 Sq | 686 9.5 Jo | *182133* | 686 13.3 So | 652 5.4 Pb | 658 5.9 Rb |
| 666 8.5 Ra | 687 9.6 Kn | 621 13.8 En | 690 12.8 So | 652 5.5 Hr | 658 5.5 Ar |
| 667 8.6 Ru | 691 9.7 Jo | 655 11.7 En | **R Sct** | 652 5.5 Ko | 658 5.6 Af |
| 667 8.0 Gw | **X Dra** | **SV Her** | *184205* | 652 5.7 Sq | 658 5.4 Se |
| 667 8.5 Jo | 180666 | 182224 | 593 5.5 Kd | 652 5.5 Ar | 658 5.6 Kg |
| 667 8.5 Ba | 653 14.4 Pf | 654 12.5 Pt | 595 5.5 Kd | 652 5.4 Af | 658 5.2 Cy |
| 669 8.4 Ru | 681 13.1 Es | **T Ser** | 597 5.5 Kd | 652 5.5 Mc | 658 5.5 Lr |
| 670 8.2 Gw | 687 12.0 Kn | 182306 | 606 5.4 Kd | 653 5.6 Fr | 658 5.0 Ba |
| 670 9.0 Hh | **Nov Oph** | 654 12.9 Pt | 611 5.3 Kd | 653 5.6 Hk | 658 5.8 Pt |
| 674 8.5 Gw | 180911 | 660 13.0 Bs | 619 5.5 Si | 653 5.5 Pb | 659 5.4 Fr |
| 675 8.6 Gw | 652 13.6 Ar | 690 12.1 Pt | 621 5.6 Mn | 653 5.7 Tr | 659 5.5 Lf |
| 677 8.5 Ba | 655 12.9 Ar | **SV Dra** | 622 5.4 Kd | 653 5.9 Kp | 659 5.4 Pb |
| 677 8.7 Hf | 660 12.9 Ar | 183149 | 626 5.0 Kd | 653 5.9 Rb | 659 5.4 Tr |
| 678 8.8 Gw | 663 13.2 Ar | 680 12.5 Ma | 629 5.9 Ra | 653 5 5 Ar | 659 5.4 Ar |
| 678 8.6 Sq | 666 12.8 Ar | **RZ Her** | 629 5.8 Mn | 653 5.6 Af | 659 5.4 Af |
| 679 8.5 Jo | 667 13.0 Ar | 183225 | 634 5.7 Pt | 653 5.4 Se | 660 5.4 Fr |
| 680 8.8 Ah | 676 13.3 Ar | 669 13.3 Pf | 635 5.7 Ch | 653 5.6 Kg | 660 5.4 Pb |
| 680 8.1 Pt | 679 13.6 Ar | **X Oph** | 635 5.8 Wd | 653 5.6 Pt | 660 5.4 Ar |
| 681 9.0 Wa | **RY Oph** | 183308 | 635 5.6 Pt | 653 5.4 Jo | 660 5.5 Af |
| 682 8.7 Ah | 181103 | 621 8.4 Mn | 635 5.0 Jo | 654 5.6 Lf | 660 5.7 Mc |
| 682 8.7 Jo | 640 11.5 Ra | 629 8.5 Mn | 636 5.0 Jo | 654 5.4 Lu | 660 5.5 Pt |
| 685 9.0 Sx | 654 12.1 Pt | 635 8.4 Jo | 636 5.6 Pt | 654 5.5 Ko | 660 5.3 Jo |
| 685 8.8 Hf | 656 12.0 Es | 636 9.0 Rc | 636 5.8 Mn | 654 5.9 Kp | 661 5.5 Jo |
| 689 8.8 Ru | 680 13.3 Pt | 640 8.7 Ra | 636 5.7 Kg | 654 5.9 Rb | 661 6.1 Rc |
| 689 8.9 Cy | 682 12.8 Es | 640 8.8 Jo | 636 5.2 Bc | 654 5.4 Se | 661 5.7 Hf |
| 690 8.5 Wh | **W Lyr** | 645 8.9 Ko | 636 5.2 Cy | 654 5.1 Cy | 661 6.0 Rb |
| 690 9.1 Wa | 181136 | 649 8.6 Jo | 637 5.4 Jo | 654 5.6 Pt | 661 5.4 Pb |
| 691 8.9 Jo | 635 12.1 So | 649 8.6 Mn | 637 5.5 Pt | 655 5.6 Lf | 662 5.6 Fr |
| 691 9.1 Ba | 653 12.1 Wd | 649 9.0 Rc | 638 5.5 Pt | 655 5.7 Pb | 662 5.7 Lf |
| 691 9.1 Gy | 654 12.5 Pt | 651 9.0 Kp | 638 5.7 Kg | 655 5.7 Tr | 662 5.7 Pb |
| **W Dra** | 655 12.5 Jo | 653 8.9 Kp | 638 5.3 Hr | 655 5.5 Hr | 662 5.6 Tr |
| 180565 | 655 12.1 Kg | 654 8.6 Pt | 639 5.3 Sl | 655 5.3 Lu | 662 5.5 Bc |
| 653 9.9 Pf | 656 12.2 Ch | 655 9.1 Ko | 640 5.8 Ra | 655 5.8 Kp | 662 5.7 Ar |
| 654 9.9 Fi | 657 12.0 Pk | 655 8.5 Mn | 640 5.7 Jo | 655 5.9 Rb | 662 5.6 Af |

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R Sct | | | R Sct | | | R Sct | | | R Sct | | | Nov Aql | | | Nov Aql | | |
| *184205* | | | *184205* | | | *184205* | | | *184205* | | | 184300 | | | 184300 | | |
| 662 | 5.6 | Hu | 670 | 5.5 | Tr | 677 | 5.4 | Se | 684 | 5.6 | Mc | 662 | 10.6 | Fr | 689 | 10.9 | Cy |
| 663 | 5.7 | Pt | 670 | 5.8 | Jo | 677 | 5.2 | Wa | 685 | 5.6 | Hf | 662 | 10.6 | Pb | 691 | 10.6 | Gy |
| 663 | 5.7 | Lf | 670 | 5.6 | Wp | 677 | 5.5 | Hf | 685 | 5.4 | Cm | 662 | 10.5 | Hu | 691 | 10.6 | Bs |
| 663 | 5.7 | Pb | 670 | 5.9 | Rb | 677 | 5.5 | Ba | 685 | 5.9 | Ra | 663 | 10.9 | Ar | 691 | 11.1 | Jo |
| 663 | 5.7 | Tr | 670 | 5.4 | Ar | 677 | 5.7 | Kg | 685 | 5.3 | Sx | 663 | 10.9 | Lf | 691 | 10.9 | So |
| 663 | 5.5 | Bc | 670 | 5.5 | Af | 677 | 5.7 | Cm | 685 | 5.7 | Kg | 663 | 10.9 | Pb | S Sct | | |
| 663 | 5.5 | Hr | 670 | 5.6 | Wa | 678 | 5.7 | Gw | 685 | 5.6 | Pt | 663 | 10.9 | Tr | *184408* | | |
| 663 | 5.7 | Ar | 671 | 5.4 | Fr | 678 | 5.4 | Lf | 686 | 5.2 | Cy | 663 | 11.6 | Pt | 635 | 7.4 | Lt |
| 663 | 5.7 | Af | 671 | 5.4 | Lf | 678 | 5.2 | Pb | 686 | 5.4 | Jo | 665 | 11.2 | Ar | RX Lyr | | |
| 664 | 5.7 | Pb | 671 | 5.4 | Pb | 678 | 5.4 | Tr | 686 | 5.3 | Wp | 665 | 11.3 | Af | 185032 | | |
| 664 | 5.6 | Pt | 671 | 5.4 | Tr | 678 | 5.3 | Cy | 686 | 5.2 | Wa | 665 | 11.2 | Pb | 669 | 14.8 | Pf |
| 664 | 5.5 | Lu | 671 | 5.5 | Jo | 678 | 5.8 | Mc | 687 | 5.8 | Sx | 666 | 10.8 | Ar | 678 | 14.6 | Ar |
| 664 | 5.5 | Sq | 671 | 5.6 | Bc | 678 | 5.6 | Pt | 687 | 5.5 | Mc | 666 | 10.9 | Af | 678 | 14.5 | Lf |
| 664 | 5.0 | Wa | 671 | 5.7 | Wd | 678 | 5.4 | Dh | 689 | 5.1 | Cy | 666 | 10.9 | Fr | 678 | 14.7 | Hu |
| 664 | 5.6 | Kg | 671 | 5.8 | Rb | 678 | 5.4 | Ar | 689 | 5.8 | Rc | 666 | 10.8 | Pb | 679 | 14.6 | Hu |
| 665 | 5.8 | Lf | 671 | 5.4 | Ar | 678 | 5.9 | Rc | 690 | 5.8 | Jo | 667 | 11.3 | Ar | 679 | 14.7 | Lf |
| 665 | 5.8 | Pb | 671 | 5.4 | Af | 678 | 5.5 | Hk | 690 | 5.7 | Pt | 667 | 11.2 | Af | 679 | 14.7 | Ar |
| 665 | 5.8 | Ar | 672 | 5.4 | Lf | 678 | 5.2 | Wa | 690 | 5.5 | Wa | 667 | 11.3 | Pb | 690 | 13.4 | So |
| 665 | 5.7 | Af | 672 | 5.5 | Wa | 679 | 5.3 | Dh | 691 | 5.8 | Ba | 667 | 11.0 | Jo | S CrA | | |
| 666 | 5.6 | Fr | 672 | 5.4 | Pb | 679 | 5.3 | Lf | 691 | 5.7 | Gy | 667 | 11.7 | Pt | *185437a* | | |
| 666 | 5.8 | Lf | 672 | 5.4 | Fi | 679 | 5.3 | Tr | 691 | 5.7 | Wd | 667 | 11.1 | So | 621 | 11.7 | En |
| 666 | 5.7 | Pb | 672 | 5.5 | Bc | 679 | 5.4 | Jo | 691 | 5.5 | Jo | 669 | 10.9 | Ar | 623 | 11.6 | Ht |
| 666 | 5.7 | Tr | 672 | 5.5 | Wp | 679 | 5.5 | Bc | 691 | 5.6 | Pt | 669 | 11.0 | Af | 629 | 11.5 | Ht |
| 666 | 5.7 | Pt | 672 | 5.4 | Af | 679 | 5.2 | Pb | 692 | 5.5 | Pt | 669 | 11.0 | Fr | 634 | 11.4 | Ht |
| 666 | 5.8 | Ra | 674 | 5.4 | Hk | 679 | 5.4 | Wd | 692 | 5.5 | Mc | 669 | 10.8 | Lf | 640 | 11.6 | Sl |
| 666 | 5.7 | Ar | 674 | 5.4 | Lf | 679 | 5.9 | Rb | 692 | 5.6 | Hf | 669 | 10.9 | Pb | 648 | 11.7 | Sl |
| 666 | 5.7 | Af | 674 | 5.3 | Pb | 679 | 5.3 | Ar | 693 | 5.6 | Pt | 669 | 10.9 | Tr | 654 | 12.0 | En |
| 667 | 5.6 | Kg | 674 | 5.4 | Tr | 679 | 5.4 | Se | 693 | 5.7 | Kg | 670 | 10.8 | Ar | ST Sgr | | |
| 667 | 5.6 | Hk | 674 | 5.6 | Bc | 679 | 5.3 | Wa | 696 | 5.9 | Lr | 670 | 10.9 | Af | *185512a* | | |
| 667 | 5.6 | Pb | 674 | 5.3 | Ar | 679 | 5.5 | Ba | RW Lyr | | | 670 | 10.8 | Pb | 651 | 12.3 | Ch |
| 667 | 5.7 | Tr | 674 | 5.3 | Dh | 680 | 5.4 | Dh | 184243 | | | 670 | 10.9 | Tr | 677 | 12.3 | Wp |
| 667 | 5.4 | Jo | 675 | 5.4 | Fr | 680 | 5.3 | Lf | 677 | 13.7 | Wp | 674 | 11.2 | Ar | R CrA | | |
| 667 | 5.6 | Pt | 675 | 5.4 | Lf | 680 | 5.1 | Cy | 691 | 12.6 | Gy | 674 | 11.0 | Fr | *185537a* | | |
| 667 | 5.5 | Bc | 675 | 5.4 | Pb | 680 | 5.5 | Jo | Nov Aql | | | 674 | 11.2 | Pb | 621 | 11.1 | En |
| 667 | 5.5 | Lu | 675 | 5.4 | Tr | 680 | 6.0 | Ma | 184300 | | | 675 | 10.8 | Ar | 623 | 10.3 | Ht |
| 667 | 5.7 | Wd | 675 | 5.4 | Bc | 680 | 5.7 | Pt | 635 | 11.4 | Jo | 675 | 10.9 | Fr | 629 | 10.3 | Ht |
| 667 | 5.9 | Rb | 675 | 5.5 | Sq | 680 | 6.1 | Wh | 636 | 11.6 | Pt | 675 | 10.9 | Af | 634 | 10.3 | Ht |
| 667 | 5.6 | Ar | 675 | 5.4 | Ar | 680 | 5.6 | Wd | 640 | 11.4 | Jo | 675 | 10.8 | Pb | 640 | 9.9 | Sl |
| 667 | 5.6 | Af | 675 | 5.4 | Af | 680 | 5.5 | Lu | 640 | 11.0 | Ra | 676 | 10.5 | Ar | 648 | 11.7 | Sl |
| 667 | 5.4 | Se | 675 | 5.4 | Dh | 680 | 5.5 | Ko | 651 | 11.0 | Ar | 676 | 10.5 | Dh | T CrA | | |
| 667 | 5.9 | Mn | 676 | 5.3 | Lf | 680 | 5.9 | Rb | 652 | 10.9 | Ar | 676 | 10.6 | Lf | *185537b* | | |
| 667 | 5.5 | Ba | 676 | 5.2 | Pb | 680 | 5.8 | Mn | 652 | 10.8 | Af | 676 | 10.5 | Pb | 629 | 12.4 | Ht |
| 668 | 5.5 | Jo | 676 | 5.3 | Tr | 680 | 5.0 | Wa | 653 | 11.0 | Ar | 676 | 10.5 | Tr | 634 | 12.4 | Ht |
| 668 | 5.7 | Pt | 676 | 5.5 | Wd | 681 | 5.3 | Lf | 655 | 10.9 | Ar | 677 | 11.6 | Pt | 648 | 13.0 | Sl |
| 668 | 5.5 | Ch | 676 | 5.5 | Ko | 681 | 5.3 | Jo | 655 | 10.9 | Af | 678 | 10.7 | Ar | Z Lyr | | |
| 668 | 5.6 | Wd | 676 | 5.6 | Kp | 681 | 5.1 | Cy | 655 | 10.4 | So | 678 | 10.6 | Dh | 185634 | | |
| 668 | 5.6 | Ko | 676 | 5.9 | Rb | 681 | 5.3 | Ko | 655 | 11.3 | Jo | 678 | 10.9 | Hk | 658 | 11.5 | Pt |
| 669 | 5.4 | Fr | 676 | 5.2 | Ar | 681 | 5.9 | Rb | 658 | 10.6 | Ar | 678 | 10.7 | Lf | 663 | 11.5 | So |
| 669 | 5.5 | Lf | 676 | 5.2 | Dh | 681 | 5.6 | Kp | 658 | 10.6 | Af | 678 | 10.7 | Pb | 678 | 11.1 | So |
| 669 | 5.4 | Pb | 676 | 5.1 | Wa | 681 | 5.5 | Se | 658 | 10.6 | Pb | 678 | 10.8 | Tr | 686 | 10.5 | So |
| 669 | 5.4 | Tr | 676 | 5.5 | Hf | 681 | 5.2 | Wa | 659 | 10.6 | Ar | 678 | 10.8 | Hu | 686 | 10.6 | Jo |
| 669 | 5.4 | Jo | 677 | 5.4 | Lf | 682 | 5.8 | Lr | 659 | 10.6 | Pb | 679 | 10.4 | So | 690 | 10.2 | Pt |
| 669 | 5.4 | Bc | 677 | 5.2 | Pb | 682 | 5.1 | Wa | 660 | 10.5 | Ar | 679 | 10.9 | Lf | 690 | 9.9 | So |
| 669 | 5.9 | Rb | 677 | 5.4 | Pt | 683 | 5.3 | Wa | 660 | 10.5 | Pb | 679 | 10.9 | Ar | 691 | 10.2 | Gy |
| 669 | 5.4 | Ar | 677 | 5.8 | Fs | 683 | 5.6 | Hf | 661 | 11.4 | Jo | 680 | 10.9 | Ma | 691 | 10.2 | Jo |
| 669 | 5.5 | Af | 677 | 5.5 | Lu | 683 | 5.5 | Wp | 662 | 11.3 | Bc | 681 | 11.0 | Jo | SU Sgr | | |
| 670 | 5.4 | Lf | 677 | 5.5 | Ko | 683 | 5.2 | Jo | 662 | 10.5 | Ar | 686 | 10.7 | So | *185722* | | |
| 670 | 5.5 | Pb | 677 | 5.6 | Kp | 683 | 5.7 | Mc | 662 | 10.7 | Af | 689 | 11.0 | Ra | 623 | 8.4 | Ht |

## Variable Star Observations Received During September, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SU Sgr** | | | **V Lyr** | | | **TY Aql** | | | **W Aql** | | | **RY Sgr** | | | **TZ Cyg** | | |
| *185722* | | | 190529a | | | *190907* | | | *191007* | | | *191033* | | | 191350 | | |
| 629 | 8.4 | Ht | 683 | 9.0 | Es | 675 | 10.5 | Hk | 659 | 13.1 | Ar | 650 | 8.6 | En | 658 | 11.0 | Pb |
| 634 | 8.3 | Ht | 683 | 9.0 | Md | 675 | 10.5 | Pb | 663 | 13.0 | Ar | 651 | 8.8 | En | 658 | 11.2 | Pt |
| **RT Lyr** | | | 686 | 8.8 | Jo | 678 | 10.4 | Pb | 666 | 12.8 | Ar | 652 | 9.1 | Hr | 659 | 11.0 | Pb |
| 185737 | | | 686 | 9.2 | So | 678 | 10.4 | Ar | 667 | 12.7 | Ar | 653 | 8.6 | Ch | 659 | 11.2 | Af |
| 634[ | 13.9 | So | 690 | 8.4 | Pt | 679 | 10.2 | Ar | 667 | 12.4 | So | 653 | 8.8 | En | 659 | 11.0 | Ar |
| 658[ | 13.7 | Ch | 691 | 9.0 | Gy | 679 | 10.2 | Tr | 669 | 12.6 | Ar | 653 | 8.6 | Pt | 662 | 11.4 | Ch |
| 667[ | 13.9 | Pf | **RX Sgr** | | | 679 | 11.8 | So | 675 | 12.1 | Ar | 653 | 8.1 | Jo | 662 | 11.3 | Ar |
| 686 | 13.5 | So | *190818* | | | 679 | 10.4 | Hu | 678 | 11.7 | Ar | 654 | 8.5 | Pt | 663 | 11.1 | Tr |
| 690 | 13.3 | So | 629[ | 13.1 | Ht | 686 | 11.0 | So | 678 | 11.7 | Lf | 655 | 8.4 | Jo | 663 | 11.2 | Ar |
| **V Aql** | | | 650[ | 13.1 | Ch | 688 | 10.8 | BH | 678 | 11.7 | Pb | 656 | 9.2 | Hr | 666 | 11.2 | Ar |
| *185905* | | | 658[ | 12.4 | Pt | 689 | 10.5 | Cy | 679 | 11.7 | Ar | 658 | 6.2 | Pt | 666 | 11.2 | Pb |
| 621 | 7.9 | Mn | **RW Sgr** | | | 690 | 10.2 | Pt | 679 | 11.7 | Hu | 658 | 8.8 | En | 666 | 11.2 | Tr |
| 629 | 7.5 | Mn | *190819a* | | | 691 | 11.0 | So | 679 | 11.0 | So | 660 | 8.6 | Jo | 667 | 11.3 | Ar |
| 630 | 7.6 | Mn | 623 | 9.5 | Ht | | **S Lyr** | | 686 | 11.9 | So | 660 | 8.4 | En | 667 | 11.3 | Hk |
| 636 | 7.6 | Mn | 629 | 9.6 | Ht | | 190925 | | 688 | 11.4 | BH | 661 | 8.2 | Kn | 667 | 11.3 | Pb |
| 649 | 7.6 | Mn | 634 | 9.6 | Ht | 654 | 12.7 | Wu | 690 | 11.4 | Pt | 661 | 8.5 | Jo | 667 | 11.2 | Tr |
| 655 | 7.7 | Mn | 637 | 9.7 | Jo | 658 | 12.5 | Pt | 691 | 11.9 | So | 661 | 8.2 | Pt | 669 | 11.2 | Ar |
| 656 | 7.9 | Hr | 642 | 9.2 | Jo | 690[ | 12.9 | Pt | **T Sgr** | | | 662 | 8.3 | Ch | 669 | 11.2 | Pb |
| 667 | 7.7 | Mn | 650 | 10.0 | Ch | **X Lyr** | | | *191017* | | | 663 | 8.4 | Pt | 669 | 11.3 | Tr |
| 680 | 7.7 | Mn | 658 | 9.0 | Pt | 190926 | | | 636 | 11.0 | Jo | 663 | 9.0 | Hr | 670 | 11.0 | Tr |
| **R Aql** | | | 681 | 10.0 | Jo | 656 | 9.4 | Hr | 650 | 11.3 | Ch | 667 | 8.2 | Jo | 670 | 11.1 | Ar |
| 190108 | | | 690 | 10.4 | Pt | 658 | 9.0 | Pt | 658 | 11.2 | Pt | 667 | 8.2 | Pt | 670 | 10.9 | Hk |
| 621 | 9.6 | Mn | 691 | 10.2 | Jo | 690 | 8.9 | Pt | 690 | 12.5 | Pt | 667 | 7.9 | Kn | 670 | 11.0 | Pb |
| 629 | 9.7 | Mn | **TY Aql** | | | **RS Lyr** | | | **R Sgr** | | | 668 | 8.0 | Jo | 671 | 11.1 | Pb |
| 635 | 9.5 | So | *190907* | | | 190933a | | | *191019* | | | 668 | 8.2 | Pt | 671 | 11.1 | Ar |
| 636 | 8.9 | Jo | 652 | 10.7 | Ar | 658 | 11.1 | Pt | 623 | 12.1 | Ht | 670 | 7.8 | Jo | 671 | 11.2 | Af |
| 638 | 9.8 | Mn | 652 | 10.7 | Af | 678 | 11.8 | So | 629 | 11.9 | Ht | 678 | 8.1 | Pt | 674 | 11.1 | Ar |
| 641 | 9.2 | Ch | 653 | 10.9 | Ar | 686 | 12.5 | So | 650 | 12.8 | Ch | 679 | 8.2 | Pt | 674 | 11.1 | Af |
| 642 | 9.2 | Jo | 655 | 10.6 | Ar | 690 | 13.4 | So | 680 | 11.9 | Wd | 680 | 8.1 | Pt | 674 | 11.2 | Hk |
| 649 | 10.0 | Mn | 655 | 10.6 | Af | 690 | 12.6 | Pt | 690 | 11.8 | Pt | 680 | 7.9 | Kn | 674 | 11.0 | Pb |
| 654 | 9.9 | Ko | 655 | 10.6 | Pb | **RU Lyr** | | | **RY Sgr** | | | 680 | 8.0 | Jo | 674 | 11.2 | Tr |
| 655 | 9.5 | Jo | 658 | 10.6 | Af | 190941 | | | *191033* | | | 681 | 8.0 | Jo | 675 | 11.2 | Tr |
| 655 | 10.3 | Mn | 658 | 10.5 | Ar | 658[ | 12.3 | Pt | 619 | 8.8 | En | 685 | 8.1 | Pt | 675 | 11.4 | Dh |
| 658 | 10.8 | Pt | 658 | 10.5 | Pb | 667[ | 12.7 | Pf | 621 | 9.1 | En | 686 | 8.4 | Jo | 675 | 11.3 | Hk |
| 664 | 10.8 | Wa | 658 | 10.2 | Pt | 681[ | 14.3 | Ie | 622 | 8.0 | Dk | 688 | 8.6 | BH | 675 | 11.2 | Pb |
| 667 | 10.9 | Jo | 659 | 10.7 | Pb | 690[ | 13.3 | Pt | 623 | 8.6 | Ht | 690 | 8.5 | Jo | 675 | 11.2 | Ar |
| 676 | 11.0 | Wa | 659 | 10.8 | Ar | **U Dra** | | | 629 | 8.4 | Ht | 690 | 9.4 | Pt | 678 | 11.0 | Ar |
| 677 | 11.0 | Wa | 662 | 10.4 | Ar | 190967 | | | 630 | 8.0 | Dk | 691 | 8.5 | Pt | 678 | 11.1 | Hk |
| 677 | 10.9 | Ko | 662 | 10.5 | Af | 640 | 12.3 | Ra | 634 | 8.2 | Bl | 691 | 8.6 | Jo | 678 | 10.9 | Lf |
| 679 | 11.3 | So | 662 | 10.4 | Fr | 650 | 13.3 | Fi | 634 | 8.3 | Ht | 693 | 8.4 | Pt | 678 | 11.0 | Pb |
| 680 | 10.9 | Mn | 662 | 10.5 | Pb | 653 | 13.4 | Pf | 634 | 8.6 | Pt | **TY Sgr** | | | 678 | 10.9 | Tr |
| 681 | 11.0 | Jo | 662 | 10.6 | Tr | 654 | 13.1 | Fi | 635 | 8.3 | Bl | *191124* | | | 678 | 11.0 | Hu |
| 686 | 11.4 | So | 663 | 10.6 | Tr | 658 | 13.4 | Pt | 635 | 8.8 | En | 691 | 10.0 | Jo | 679 | 11.1 | Hu |
| 689 | 11.1 | Cy | 663 | 10.7 | Lf | 660 | 13.7 | Bs | 635 | 8.5 | Jo | **S Sgr** | | | 679 | 11.0 | Ar |
| 690 | 11.0 | Pt | 663 | 10.6 | Ar | 666 | 13.0 | Wu | 636 | 8.4 | Pt | *191319a* | | | 689 | 11.3 | Ra |
| 691 | 11.2 | Jo | 665 | 10.8 | Ar | 667 | 13.6 | Pf | 636 | 7.9 | Dk | 629[ | 12.9 | Ht | 690 | 10.8 | Pt |
| 691 | 11.1 | So | 665 | 10.8 | Pb | 677 | 13.6 | Wp | 637 | 8.4 | Pt | 650 | 13.6 | Ch | **U Lyr** | | |
| **V Lyr** | | | 666 | 11.0 | Ar | 679 | 13.7 | Wp | 637 | 8.5 | Jo | 680[ | 13.0 | Wd | 191637 | | |
| 190529a | | | 666 | 11.1 | Pb | 681 | 13.5 | Wp | 638 | 8.4 | En | 690[ | 12.7 | Pt | 640 | 11.6 | Ra |
| 634 | 11.6 | So | 667 | 10.9 | Ar | 681 | 13.4 | Fi | 640 | 8.0 | Sl | **TZ Cyg** | | | 658 | 12.0 | Pt |
| 655 | 9.2 | So | 667 | 10.9 | Pb | 690 | 13.9 | Wp | 641 | 8.0 | Jo | 191350 | | | 667 | 11.8 | Ra |
| 656 | 9.2 | Md | 667 | 10.9 | Tr | **W Aql** | | | 642 | 7.8 | Dk | 631 | 10.6 | Ra | 690 | 11.8 | Pt |
| 658 | 9.2 | Pt | 667 | 11.0 | So | *191007* | | | 646 | 8.3 | Bl | 637 | 10.4 | Jo | **AF Cyg** | | |
| 663 | 9.6 | So | 669 | 11.0 | Pb | 651 | 13.5 | Ch | 647 | 8.8 | En | 652 | 10.9 | Ar | 192745 | | |
| 672 | 8.8 | Md | 669 | 10.9 | Tr | 652 | 13.2 | Ar | 648 | 8.1 | Sl | 653 | 11.1 | Ar | 591 | 7.5 | Kd |
| 677 | 8.7 | Md | 669 | 11.0 | Lf | 653 | 13.3 | Ar | 649 | 7.9 | Dk | 653 | 11.1 | Hk | 606 | 6.9 | Kd |
| 678 | 9.2 | So | 669 | 11.0 | Ar | 658 | 12.9 | Ar | 649 | 8.8 | Pt | 658 | 11.0 | Ar | 640 | 7.3 | Ra |
| 680 | 9.0 | Ie | 675 | 10.5 | Ar | 658 | 13.0 | Pt | 650 | 8.6 | Pt | 658 | 10.8 | Af | 658 | 7.6 | Ah |

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AF CYG | | | T PAV | | | RT CYG | | | χ CYG | | | Z CYG | | | RW AQL | | |
| 192745 | | | *193972* | | | 194048 | | | 194632 | | | 195849 | | | 200715b | | |
| 674 | 7.5 | Ah | 624 | 13.0 | Ht | 683 | 7.2 | Hf | 650 | 13.5 | Ch | 681 | 8.4 | Jo | 649 | 9.2 | Jo |
| 680 | 7.4 | Ah | 631 | 12.8 | Ht | 686 | 7.2 | Jo | 655 | 13.3 | Wd | 683 | 8.4 | Hf | 655 | 9.2 | Jo |
| 682 | 7.5 | Ah | 636 | 12.3 | Ht | 689 | 7.9 | Ra | 658 | 13.4 | Pt | 689 | 8.4 | Ra | 658 | 9.5 | Pt |
| 689 | 6.9 | Ra | RT CYG | | | 690 | 7.2 | Pt | 667 | 13.6 | Wa | 690 | 8.0 | Pt | 661 | 9.4 | Jo |
| TY CYG | | | 194048 | | | 691 | 7.5 | Gy | 677 | 12.6 | Wd | 691 | 8.4 | Jo | 669 | 9.2 | Jo |
| 192928 | | | 621 | 9.2 | Ma | 692 | 8.0 | Mc | 679 | 13.5 | Wa | S TEL | | | 690 | 9.3 | Pt |
| 634[ | 13.8 | So | 631 | 8.1 | Ra | TV CYG | | | 679 | 13.6 | Wp | *195855* | | | 691 | 9.4 | Jo |
| 651[ | 12.8 | Ch | 635 | 7.8 | Jo | 194348 | | | 680 | 13.2 | Wd | 623 | 12.8 | Ht | RU AQL | | |
| 669[ | 14.0 | Pf | 635 | 8.0 | Ch | 631 | 10.1 | Ra | 680 | 13.1 | Ma | 631 | 12.9 | Ht | 200812 | | |
| 678[ | 13.4 | So | 641 | 6.8 | Ma | 635 | 9.0 | Jo | 683 | 13.5 | Wa | 636 | 12.8 | Ht | 636 | 10.1 | Jo |
| 690[ | 12.7 | Pt | 642 | 7.2 | Jo | 635 | 9.5 | Ch | 683 | 13.6 | Wp | SY AQL | | | 670 | 11.1 | Wp |
| RT AQL | | | 649 | 7.3 | Fi | 641 | 10.2 | Ma | RU SGR | | | 200212 | | | 680 | 11.4 | Ma |
| 193311 | | | 650 | 7.3 | Fi | 651 | 10.6 | Lf | *195142* | | | 658 | 11.8 | Es | W CAP | | |
| 651 | 13.1 | Ch | 651 | 7.0 | Mc | 652 | 10.2 | Ry | 623 | 12.4 | Ht | 658 | 11.2 | Pt | *200822* | | |
| 658 | 13.1 | Pt | 652 | 6.9 | Mc | 654 | 10.5 | Wd | 629 | 13.0 | Ht | 660 | 10.8 | Md | 658 | 12.0 | Pt |
| 690[ | 13.4 | Pt | 653 | 6.7 | Lu | 655 | 9.5 | Jo | 634 | 12.7 | Ht | 672 | 9.5 | Md | 690[ | 13.3 | Pt |
| R CYG | | | 654 | 6.8 | Lu | 657 | 10.5 | Ry | RR AQL | | | 678 | 9.3 | Wa | Z AQL | | |
| 193449 | | | 654 | 6.8 | Ko | 658 | 10.8 | Pt | *195202* | | | 679 | 9.2 | Wa | *200906* | | |
| 631 | 11.5 | Ra | 654 | 6.6 | Wd | 661 | 11.1 | Wu | 691[ | 12.3 | Gy | 679 | 10.0 | Sf | 628 | 12.4 | Hi |
| 635 | 12.1 | Ch | 655 | 7.4 | Jo | 666 | 10.7 | Ar | RS AQL | | | 679 | 9.6 | Wp | 654 | 11.1 | Fi |
| 650 | 12.5 | Kg | 655 | 6.8 | Se | 666 | 10.7 | Pb | *195308* | | | 681 | 9.1 | Wa | 658 | 11.1 | Pt |
| 650 | 12.6 | Fi | 655 | 6.7 | Lu | 666 | 10.7 | Tr | 691[ | 11.8 | Gy | 686 | 9.5 | Jo | 678 | 9.2 | Hi |
| 651 | 12.6 | Pk | 656 | 7.1 | Mc | 671 | 10.9 | Wd | Nov CYG | | | 689 | 9.6 | Md | 679 | 9.5 | Wa |
| 654 | 12.6 | Wd | 656 | 7.0 | Kg | 671 | 11.0 | Ry | 195553 | | | 690 | 9.1 | Pt | 680 | 9.4 | Jo |
| 654 | 12.6 | Fi | 656 | 6.8 | Se | 671 | 10.9 | Sh | 651 | 13.3 | Wu | 691 | 9.3 | Jo | 681 | 9.0 | Ie |
| 656 | 12.5 | Kg | 657 | 6.8 | Lu | 676 | 11.2 | Ry | 652 | 13.6 | Ar | S CYG | | | 690 | 9.0 | Wa |
| 658 | 12.7 | Pt | 657 | 6.8 | Se | 679 | 11.2 | Ry | 658 | 13.4 | Ar | 200357 | | | 690 | 9.7 | Pt |
| 660 | 12.9 | Bs | 658 | 7.1 | Ah | 680 | 11.4 | Ma | 660 | 13.4 | Ar | 635 | 11.4 | Ch | 690 | 8.8 | BH |
| 667 | 13.1 | Wp | 658 | 6.8 | Pt | 689 | 11.8 | Ra | 662 | 13.8 | Ch | 654 | 9.5 | Wd | R SGE | | |
| 671 | 12.8 | Wd | 661 | 7.4 | Jo | 690 | 11.4 | Pt | 663 | 13.5 | Ar | 656 | 11.5 | Md | 200916 | | |
| 671 | 12.8 | Sh | 664 | 6.7 | Lu | X AQL | | | 665 | 13.0 | Ar | 656 | 10.8 | Mc | 635 | 9.0 | Jo |
| 672 | 12.9 | Fi | 664 | 6.8 | Hf | 194604 | | | 666 | 13.1 | Ar | 658 | 11.0 | Pt | 641 | 9.2 | Jo |
| 672 | 13.0 | Wp | 666 | 6.5 | Tr | 628 | 8.8 | Hi | 667 | 13.3 | Ar | 662 | 11.1 | Ch | 649 | 9.4 | Jo |
| 672 | 13.0 | Wa | 666 | 6.4 | Ar | 635 | 8.6 | Jo | 669 | 13.6 | Ar | 677 | 11.2 | Md | 655 | 9.4 | Jo |
| 677 | 12.9 | Wp | 666 | 6.4 | Pb | 637 | 8.6 | Jo | 670 | 13.0 | Ar | 690 | 11.4 | Pt | 661 | 9.2 | Jo |
| 679 | 13.2 | Wp | 667 | 6.6 | Wa | 640 | 8.9 | Ra | 675 | 13.4 | Ar | R CAP | | | 669 | 9.2 | Jo |
| 679 | 12.9 | Wd | 667 | 6.8 | Wp | 642 | 8.8 | Jo | 678 | 14.3 | Ar | *200514* | | | 691 | 9.3 | Jo |
| 681 | 13.2 | Wp | 669 | 6.9 | Hf | 647 | 8.9 | Hi | 678 | 14.3 | Lf | 640 | 11.6 | Jo | RS CYG | | |
| 681 | 13.0 | F | 670 | 7.0 | Wp | 649 | 9.1 | Jo | 678 | 14.4 | Hu | 658 | 11.4 | Ch | 200938 | | |
| 685 | 13.1 | Wp | 671 | 6.9 | Wd | 651 | 9.4 | Mc | 679 | 14.2 | Hu | 658 | 12.1 | Pt | 601 | 7.4 | Fn |
| 685 | 13.1 | Wa | 671 | 6.8 | Kg | 654 | 9.3 | Wd | 679 | 14.2 | Ar | 660 | 11.9 | Jo | 619 | 6.4 | Si |
| 690 | 13.4 | Wp | 671 | 6.8 | Sh | 655 | 9.5 | Jo | RR TEL | | | 690 | 11.6 | Pt | 628 | 7.3 | Fn |
| 693 | 13.5 | Ie | 674 | 7.0 | Ah | 656 | 9.6 | Mc | *195656* | | | S AQL | | | 631 | 7.4 | Ra |
| RV AQL | | | 676 | 7.0 | Wa | 658 | 9.7 | Pt | 623[ | 12.8 | Ht | 200715a | | | 634 | 7.3 | Fn |
| 193509 | | | 677 | 7.0 | Wa | 660 | 9.9 | Mc | 636[ | 12.8 | Ht | 626 | 9.4 | Bg | 635 | 7.4 | Jo |
| 652 | 14.0 | Ar | 677 | 7.2 | Lu | 661 | 9.8 | Hf | Z CYG | | | 635 | 11.0 | Jo | 635 | 7.5 | Ch |
| 653 | 14.0 | Ar | 677 | 7.0 | Wp | 661 | 9.7 | Wd | 195849 | | | 641 | 11.2 | Jo | 636 | 8.6 | Wd |
| 655 | 13.5 | Ar | 677 | 6.7 | Ko | 666 | 10.0 | Ra | 631 | 9.8 | Ra | 641 | 11.4 | Ch | 638 | 8.0 | Kg |
| 662 | 14.2 | Ar | 677 | 7.2 | Hf | 677 | 10.3 | Sf | 635 | 9.2 | Jo | 649 | 11.0 | Jo | 642 | 7.4 | Fn |
| 666 | 14.2 | Ar | 679 | 6.8 | Wp | 678 | 11.0 | Hi | 642 | 8.7 | Jo | 655 | 11.2 | Jo | 643 | 7.4 | Cy |
| 667 | 14.3 | Ar | 679 | 7.2 | Se | 679 | 10.4 | Jo | 649 | 8.6 | Jo | 658 | 11.0 | Pt | 649 | 7.4 | Fn |
| 669 | 14.3 | Ar | 680 | 7.2 | Lu | 683 | 10.7 | Mc | 651 | 8.5 | Ch | 661 | 11.2 | Jo | 650 | 7.9 | Kg |
| 685 | 13.6 | Ie | 680 | 7.0 | Wp | 683 | 11.2 | Hf | 653 | 8.3 | Wd | 690 | 10.5 | Pt | 650 | 7.5 | Cy |
| TT CYG | | | 680 | 7.4 | Jo | 691 | 11.8 | Jo | 655 | 8.5 | Jo | 691 | 10.6 | Jo | 651 | 7.4 | Ch |
| 193732 | | | 680 | 7.4 | Ma | χ CYG | | | 658 | 8.0 | Pt | RW AQL | | | 653 | 7.5 | Ar |
| 635 | 8.2 | Lt | 680 | 7.2 | Ah | 194632 | | | 661 | 8.4 | Jo | 200715b | | | 653 | 8.2 | Wd |
| 648 | 8.2 | Lt | 681 | 7.2 | Fi | 631 | 12.6 | Ra | 677 | 8.4 | Hf | 635 | 9.0 | Jo | 654 | 7.3 | Ko |
| | | | 682 | 7.3 | Ah | 641 | 12.5 | Ma | 679 | 8.2 | Jo | 641 | 9.0 | Jo | 654 | 7.7 | Cy |

## Variable Star Observations Received During September, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RS Cyg | | | RS Cyg | | | WX Cyg | | | WX Cyg | | | U Cyg | | | Z Del | | |
| 200938 | | | 200938 | | | 201437b | | | 201437b | | | 201647 | | | 202817 | | |
| 655 | 7.4 | Jo | 677 | 7.3 | Ko | 641 | 10.8 | Ch | 678 | 10.3 | Pb | 657 | 8.0 | Md | 675 | 9.6 | Af |
| 655 | 7.8 | Kg | 677 | 7.3 | Pb | 650 | 11.0 | Kg | 678 | 10.2 | Tr | 658 | 8.3 | Cy | 678 | 9.7 | Ar |
| 655 | 7.0 | Lu | 677 | 7.8 | Kg | 652 | 11.0 | Ar | 678 | 10.5 | Hu | 658 | 7.8 | Wh | 678 | 9.7 | Lf |
| 656 | 7.3 | Sq | 678 | 7.4 | Ar | 653 | 10.8 | Ar | 679 | 10.8 | Wd | 658 | 7.6 | Pt | 678 | 9.7 | Pb |
| 657 | 8.2 | Sx | 678 | 7.4 | Pb | 653 | 11.2 | Wd | 679 | 10.5 | Ar | 660 | 8.7 | Mc | 678 | 9.8 | Tr |
| 658 | 8.3 | Lr | 679 | 8.1 | Wd | 654 | 11.3 | Cy | 680 | 10.7 | Lu | 661 | 8.0 | Jo | 678 | 9.6 | Hi |
| 658 | 7.8 | Cy | 679 | 7.4 | Ar | 655 | 10.6 | Jo | 680 | 10.4 | Cy | 662 | 7.8 | Ch | 679 | 9.5 | Wa |
| 658 | 7.8 | Kg | 679 | 7.3 | Pb | 655 | 11.0 | Lu | 680 | 9.8 | Jo | 663 | 9.0 | Ru | 679 | 9.5 | Lf |
| 658 | 8.0 | Lr | 679 | 7.3 | Tr | 656 | 10.5 | Sq | 680 | 10.3 | Es | 664 | 7.8 | Lu | 679 | 9.8 | Tr |
| 658 | 7.8 | Wh | 679 | 7.7 | Hu | 656 | 10.7 | Es | 685 | 10.3 | Hf | 664 | 8.2 | Kg | 679 | 9.6 | Ar |
| 658 | 7.0 | Pt | 680 | 8.1 | Wd | 656 | 10.8 | Md | 685 | 10.6 | Md | 666 | 8.0 | So | 680 | 9.3 | Ma |
| 658 | 7.3 | Pb | 680 | 7.4 | Jo | 658 | 11.0 | Kg | 685 | 10.9 | Wd | 667 | 7.8 | Ch | 681 | 9.4 | Ie |
| 659 | 7.3 | Tr | 681 | 8.1 | Wd | 658 | 10.5 | Lr | 686 | 9.4 | Jo | 667 | 8.4 | Ru | 690 | 9.0 | Wa |
| 659 | 7.4 | Ar | 682 | 7.7 | Kg | 659 | 10.9 | Pb | 691 | 9.0 | BH | 668 | 7.7 | Jo | 690 | 8.7 | Pt |
| 659 | 7.4 | Pb | 682 | 8.4 | Lr | 659 | 10.8 | Ar | 691 | 9.1 | Jo | 668 | 7.8 | Wd | 691 | 8.8 | Jo |
| 661 | 7.3 | Jo | 683 | 8.0 | Hf | 660 | 11.0 | Pb | 696 | 9.5 | Lr | 669 | 8.4 | Ru | 691 | 8.8 | Bs |
| 662 | 7.5 | Pb | 685 | 7.7 | Cm | 660 | 11.0 | Ar | V Sge | | | 670 | 7.8 | Kg | ST Cyg | | |
| 663 | 7.4 | Ar | 685 | 7.7 | Kg | 660 | 11.0 | Fr | 201520 | | | 671 | 8.1 | Kn | 202954 | | |
| 663 | 7.4 | Pb | 685 | 7.2 | Ra | 661 | 9.9 | Jo | 655 | 11.5 | Hr | 676 | 7.6 | Fs | 656 | 13.5 | Es |
| 664 | 7.5 | Ch | 685 | 8.2 | Sx | 662 | 10.8 | Ch | 666 | 11.7 | Bs | 676 | 8.3 | Wd | 658 | 13.5 | Pt |
| 664 | 7.6 | Lu | 685 | 7.5 | Wh | 662 | 10.8 | Ar | 667 | 11.8 | Rb | 686 | 7.6 | Jo | 662 | 13.6 | Ch |
| 664 | 7.4 | Pb | 686 | 7.3 | Jo | 662 | 10.9 | Pb | 679 | 11.5 | Wa | 687 | 7.8 | Mc | 677 | 11.7 | Es |
| 664 | 8.1 | Hf | 690 | 7.1 | Pt | 662 | 10.9 | Hu | 680 | 11.3 | Wp | 687 | 7.5 | Kn | 689 | 13.4 | Es |
| 664 | 7.8 | Kg | 691 | 7.3 | BH | 663 | 10.8 | Ar | 691 | 11.5 | Jo | 690 | 7.0 | Pt | 690 | 13.5 | Pt |
| 665 | 7.5 | Hk | 691 | 7.2 | Jo | 665 | 10.7 | Ar | U Cyg | | | 690 | 7.8 | So | V Vul | | |
| 665 | 7.4 | Ar | 693 | 7.6 | Kg | 665 | 10.7 | Pb | 201647 | | | 692 | 7.6 | Mc | 203226 | | |
| 665 | 7.4 | Af | 696 | 8.0 | Lr | 666 | 10.9 | Ar | 620 | 9.5 | Mn | Z Del | | | 658 | 8.7 | Pt |
| 665 | 7.5 | Pb | R Del | | | 666 | 10.9 | Fr | 629 | 9.3 | Mn | 202817 | | | 690 | 8.9 | Pt |
| 666 | 7.3 | Ar | 201008 | | | 666 | 10.9 | Pb | 631 | 9.0 | Ra | 628 | 11.6 | Hi | Y Del | | |
| 666 | 7.3 | Pb | 639 | 12.9 | My | 667 | 10.7 | Ar | 634 | 8.5 | So | 652 | 11.0 | Ar | 203611 | | |
| 667 | 7.5 | Ar | 658 | 12.8 | Pt | 667 | 10.8 | Hk | 635 | 9.0 | Ch | 653 | 11.3 | Ar | 655 | 10.0 | Ch |
| 667 | 7.5 | Pb | 660 | 13.0 | My | 667 | 10.9 | Pb | 635 | 8.4 | Jo | 653 | 11.3 | Fr | 664 | 11.4 | Bs |
| 668 | 8.0 | Wd | 665 | 13.1 | My | 667 | 10.6 | Md | 636 | 9.2 | Wd | 655 | 10.9 | Ar | 680 | 9.7 | Ma |
| 668 | 7.4 | Jo | 666 | 13.2 | Bs | 668 | 10.9 | Wd | 636 | 9.7 | Mn | 657 | 10.5 | Md | S Del | | |
| 669 | 6.9 | Kg | 668 | 13.1 | My | 669 | 10.9 | Lf | 640 | 8.4 | Kg | 658 | 10.4 | Pt | 203816 | | |
| 669 | 7.5 | Pb | 680 | 13.3 | Wp | 669 | 10.7 | Fr | 641 | 8.0 | Jo | 658 | 10.4 | Ch | 626 | 9.4 | Bg |
| 669 | 7.5 | Ar | 685 | 13.0 | My | 669 | 10.8 | Pb | 643 | 9.0 | Cy | 664 | 10.3 | Bs | 635 | 9.4 | Jo |
| 670 | 7.4 | Ar | 690 | 12.5 | Pt | 670 | 10.3 | Es | 649 | 7.5 | Mn | 666 | 9.8 | Lf | 641 | 9.5 | Jo |
| 670 | 7.4 | Af | 693 | 12.5 | My | 670 | 10.8 | Ar | 650 | 8.6 | Kg | 666 | 10.7 | Pb | 654 | 9.7 | Fi |
| 670 | 7.4 | Pb | 697 | 12.3 | My | 670 | 10.9 | Af | 651 | 8.1 | Mc | 666 | 10.7 | Ar | 655 | 9.6 | Pt |
| 670 | 7.3 | Tr | RT Cap | | | 670 | 10.9 | Tr | 651 | 8.0 | Kp | 667 | 10.3 | Ar | 658 | 10.0 | Pt |
| 670 | 7.8 | Kg | *201121* | | | 670 | 10.8 | Pb | 653 | 8.1 | Lu | 667 | 10.5 | Af | 658 | 10.2 | Ch |
| 671 | 7.6 | Ar | 595 | 7.4 | Kd | 671 | 10.9 | Ar | 653 | 8.2 | Kp | 667 | 10.3 | Pb | 662 | 10.2 | Md |
| 671 | 7.6 | Pb | 606 | 7.6 | Kd | 671 | 10.9 | Pb | 653 | 8.6 | Wd | 668 | 10.0 | Md | 669 | 10.4 | Jo |
| 672 | 7.5 | Pb | SX Cyg | | | 671 | 9.7 | Kg | 654 | 8.2 | Lu | 669 | 9.8 | Pb | 672 | 10.2 | Md |
| 674 | 7.4 | Ar | 201130 | | | 672 | 10.5 | Md | 654 | 7.7 | Ko | 669 | 9.7 | Fr | 679 | 11.3 | Jo |
| 674 | 7.5 | Af | 635 | 9.9 | Jo | 674 | 10.7 | Ar | 654 | 7.4 | Se | 669 | 9.8 | Ar | 680 | 10.5 | Wa |
| 674 | 7.4 | Fr | 641 | 9.8 | Ch | 674 | 10.8 | Hk | 655 | 7.8 | Lu | 670 | 10.0 | Ar | 680 | 10.3 | Md |
| 674 | 7.4 | Pb | 658 | 10.8 | Pt | 674 | 10.7 | Pb | 655 | 8.4 | Kp | 670 | 10.0 | Pb | 686 | 11.9 | Jo |
| 675 | 7.5 | Hk | 658 | 10.2 | Cy | 675 | 10.5 | Md | 655 | 7.3 | Se | 670 | 9.9 | Tr | 690 | 11.4 | Pt |
| 675 | 7.4 | Ar | 662 | 10.0 | Ch | 675 | 10.5 | Ar | 655 | 9.4 | Mn | 674 | 9.8 | Tr | V Cyg | | |
| 675 | 7.4 | Af | 680 | 10.7 | Ie | 675 | 10.4 | Hk | 655 | 8.2 | Jo | 674 | 9.7 | Ar | 203847 | | |
| 675 | 7.5 | Fr | 690 | 11.8 | Pt | 675 | 10.4 | Pb | 656 | 7.9 | Sq | 674 | 9.7 | Pb | 626 | 10.7 | Bg |
| 675 | 7.5 | Pb | WX Cyg | | | 676 | 10.4 | Wd | 656 | 7.3 | Se | 675 | 9.6 | Md | 631 | 11.8 | Ra |
| 676 | 8.1 | Wd | 201437b | | | 676 | 10.4 | Hf | 656 | 8.2 | Kg | 675 | 9.6 | Pb | 635 | 11.6 | Ch |
| 676 | 8.1 | Hf | 631 | 12.0 | Ra | 677 | 10.5 | Md | 656 | 8.2 | Mc | 675 | 9.5 | Lf | 652 | 11.5 | Ar |
| 677 | 7.6 | Cm | 635 | 11.6 | Cy | 678 | 10.3 | Ar | 657 | 8.0 | Lu | 675 | 9.6 | Tr | 658 | 11.8 | Pt |
| 677 | 7.8 | Lu | 635 | 11.6 | Jo | 678 | 10.3 | Lf | 657 | 8.1 | Sx | 675 | 9.6 | Ar | 663 | 12.0 | Ar |

## Variable Star Observations Received During September, 1934.

| J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. | J.D.Est.Obs. |
|---|---|---|---|---|---|
| V Cyg | V Aqr | T Aqr | R Vul | T Cep | Y Pav |
| 203847 | 204102 | *204405* | 205923a | 210868 | *211570* |
| 668 11.9 Wd | 635 8.4 Lt | 663 9.3 Ch | 635 12.2 Jo | 649 9.0 Jo | 624 6.0 Ht |
| 669 12.0 Ar | 636 8.3 Jo | 667 9.6 Jo | 641 12.0 Ch | 649 9.2 Mn | 631 6.8 Ht |
| 669 11.9 Pb | 637 8.5 Jo | 667 10.5 Cm | 649 11.7 Jo | 650 10.2 Mc | 636 5.8 Ht |
| 669 12.0 Tr | 641 8.5 Jo | 667 9.5 Bc | 655 10.4 Jo | 651 9.6 Kp | X Peg |
| 670 12.0 Lf | 649 8.7 Lt | 670 9.7 Jo | 657 9.9 Md | 651 9.4 Pk | 211614 |
| 671 12.2 Kg | 653 8.3 Jo | 676 10.5 Jo | 660 9.5 Pt | 653 9.6 Kp | 660 12.6 Pt |
| 680 12.5 Ma | 656 8.5 Jo | 677 10.5 Kg | 661 9.5 Jo | 653 9.2 Sq | 667 13.2 Ar |
| 685 12.5 Ra | 658 8.0 Pt | 677 10.5 Cm | 666 9.6 Bs | 653 9.2 Jo | 691 12.6 Pt |
| 690 12.9 Pt | 661 8.5 Jo | 680 10.0 Mn | 668 8.8 Jo | 654 9.4 Ko | T Cap |
| Y Aqr | 662 8.7 Md | 680 10.2 Hf | 668 9.2 Md | 655 9.3 Lu | *211615* |
| *203905* | 667 8.5 Jo | 681 11.0 Jo | 679 8.3 Hf | 655 9.8 Kp | 658 12.3 Ch |
| 641 13.4 Ch | 669 8.7 Jo | 682 10.4 Cm | 679 7.8 Jo | 655 9.8 Mn | 679 10.5 Jo |
| 653[12.3 Wd | 669 8.9 Kn | 685 11.0 Hf | 680 7.8 Ah | 656 9.3 Jo | S Mic |
| 683 13.2 Ie | 672 8.9 Md | 685 10.8 Wd | 681 7.9 Jo | 656 9.6 Kg | *212030* |
| 690[12.3 Pt | 679 9.1 Md | 689 11.2 Ra | 682 8.1 Ah | 657 9.6 Sx | 658 12.1 Sp |
| T Del | 679 8.6 Jo | 690 11.6 Pt | 682 8.5 Md | 660 9.2 Pt | Y Cap |
| 204016 | 681 8.9 Jo | 690 11.4 BH | 685 8.2 Hf | 662 9.8 Rc | *212814* |
| 653 11.8 Ar | 685 9.0 Md | 691 12.0 Jo | 685 7.4 Es | 664 9.4 Ch | 658 12.6 Sp |
| 653 11.8 Af | 686 8.9 Kn | 691 11.1 Cm | 691 7.2 Pt | 666 9.8 Sq | W Cyg |
| 653 11.7 Hk | 690 8.0 Pt | 696 11.2 Lr | 691 7.6 Jo | 667 9.6 Jo | 213244 |
| 654 12.5 Fi | W Aqr | RZ Cyg | V Cap | 667 10.0 Mn | 593 6.5 Kd |
| 655 12.1 Ar | *204104* | 204846 | *210124* | 669 9.9 Kn | 597 6.4 Kd |
| 655 12.1 Af | 635 8.8 Jo | 636 11.6 Bg | 691 9.4 Gy | 670 9.5 Gw | 606 6.5 Kd |
| 658 11.7 Ch | 637 9.0 Jo | 649 11.7 Fi | TW Cyg | 671 9.8 Kg | 651 6.3 Mc |
| 658 12.0 Pt | 641 8.6 Jo | 650 11.6 Fi | 210129 | 674 9.7 Gw | 656 6.2 Mc |
| 659 12.1 Pb | 653 8.7 Jo | 654 11.9 Fi | 658 13.3 Es | 675 9.9 Gw | 660 6.2 Mc |
| 660 12.0 Pb | 656 8.8 Jo | 658 12.0 Pt | 680 13.9 Ie | 676 9.9 Jo | 678 6.0 Mc |
| 660 12.0 Ar | 661 8.9 Jo | 664 11.8 Wa | X Cap | 676 10.0 Kp | 683 6.2 Mc |
| 660 12.0 Af | 667 9.1 Jo | 667 11.7 Wa | *210221* | 677 9.6 Lu | 687 6.2 Mc |
| 664 11.8 Bs | 669 9.0 Jo | 667 11.8 Wp | 691[13.0 Pt | 677 10.0 Kg | 692 6.1 Mc |
| 666 11.1 Pb | 678 9.8 Hi | 669 11.9 Wp | RS Aqr | 677 9.9 Hf | S Cep |
| 666 11.2 Ar | 679 9.5 Jo | 669 11.8 Wa | *210504* | 677 10.1 Cm | 213678 |
| 666 11.1 Af | 680 9.7 Kn | 670 11.9 Wp | 660[12.9 Pt | 678 9.9 Pk | 635 8.4 Jo |
| 669 11.1 Af | 681 10.0 Jo | 672 11.9 Wp | 683 13.8 Ie | 678 9.9 Ar | 641 8.3 Jo |
| 669 11.1 Ar | 691 10.4 Jo | 672 11.8 Fi | 691[12.9 Pt | 678 10.0 Hk | 646 9.0 Ra |
| 669 11.0 Pb | U Cap | 672 11.8 Wa | Z Cap | 678 9.9 Pb | 649 8.4 Jo |
| 669 11.1 Fr | *204215* | 677 11.9 Wp | *210516* | 679 9.8 So | 649 8.7 Fi |
| 674 10.3 Fr | 658[13.7 Ch | 679 11.9 Wp | 658 10.4 Sp | 680 9.9 Mn | 653 8.5 Sq |
| 674 10.1 Hk | V Del | 680 12.0 Wp | 658 10.0 Ch | 680 9.8 Ko | 653 8.2 Jo |
| 674 10.3 Pb | 204318 | 680 11.9 Wa | 679 9.3 Jo | 681 10.0 Kp | 654 9.0 So |
| 674 10.2 Ar | 658[13.6 Ch | 681 12.0 Wp | 691 9.3 Jo | 682 9.9 Jo | 654 9.0 Fi |
| 675 10.2 Ar | 679[14.4 Wp | 681 12.0 Fi | 691 9.8 Pt | 682 10.3 Ah | 656 8.1 Jo |
| 675 10.1 Af | 681 14.6 Fi | 685 12.1 Wp | R Equ | 683 9.9 Hf | 658 8.8 Sx |
| 675 10.2 Fr | T Aqr | 685 11.9 Wa | 210812 | 685 9.8 Sx | 661 8.0 Jo |
| 675 10.0 Hk | *204405* | 690 12.1 Wp | 660[12.2 Pt | 686 10.1 Kn | 667 8.5 Jo |
| 675 10.2 Pb | 621 8.6 Mn | 691 12.0 Pt | 680[13.5 Ma | 687 10.1 Mc | 669 8.3 Kn |
| 677 10.0 Wp | 629 8.1 Mn | S Ind | 691[12.9 Pt | 687 10.1 Ra | 670 8.8 Wp |
| 680 9.5 Wp | 635 8.0 Jo | *204954* | T Cep | 690 10.1 Jo | 670 8.2 Jo |
| 680 11.0 Wa | 637 8.0 Jo | 624 13.5 Ht | 210868 | 691 10.1 Wd | 671 8.4 Md |
| 686 9.6 Jo | 638 8.0 Mn | 636[13.5 Ht | 620 8.6 Mn | 691 9.9 Pt | 671 8.2 Es |
| 690 9.2 Pt | 641 8.3 Jo | X Del | 630 8.6 Mn | RR Aqr | 677 8.5 Wp |
| 690 8.8 Wa | 641 8.0 Ch | 205017 | 635 8.6 Jo | *210903* | 677 8.8 Hf |
| 691 9.4 Jo | 653 8.4 Jo | 659 13.9 Es | 636 8.9 Mn | 660 9.3 Pt | 677 8.8 Ba |
| U Del | 653 8.9 Wd | 691 12.2 Pt | 637 9.4 Kg | 667 9.6 Bs | 678 8.7 Sf |
| 204017 | 655 9.1 Mn | UX Cyg | 641 9.3 Wd | 668 9.8 Jo | 679 8.6 Wp |
| 635 7.0 Lt | 656 8.8 Jo | 205030a | 641 8.8 Jo | 683 9.5 Ie | 679 8.8 Sq |
| 653 6.7 Lt | 658 8.4 Pt | 667 9.4 Jo | 641 9.2 Ch | 691 9.5 Pt | 679 8.3 Jo |
| | 661 8.9 Jo | | 646 9.5 Ra | | 679 8.7 Es |

## Variable Star Observations Received During September, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S Cep** | | | **VV Cep** | | | **S Lac** | | | **R Peg** | | | **V Cas** | | | **Z And** | | |
| 213678 | | | 215363 | | | 222439 | | | 230110 | | | 230759 | | | 232848 | | |
| 680 | 9.0 | Md | 635 | 5.4 | Lt | 661 | 12.5 | Pt | 661 | 9.4 | Jo | 679 | 10.1 | Sq | 643 | 10.9 | Cy |
| 680 | 8.8 | Wp | **V Peg** | | | 682 | 12.9 | Es | 661 | 9.3 | Pt | 680 | 10.1 | Ko | 650 | 10.9 | Cy |
| 682 | 8.4 | Jo | 215605 | | | 686 | 12.8 | So | 663 | 9.6 | Ru | 680 | 11.2 | Jo | 651 | 11.1 | Pk |
| 683 | 8.2 | Kn | 661 | 11.8 | Pt | 691 | 12.6 | So | 665 | 9.2 | My | 681 | 10.4 | Hf | 652 | 10.7 | Ar |
| 685 | 9.4 | Sx | 667 | 12.2 | Ar | **R Ind** | | | 667 | 9.2 | Ru | 682 | 11.8 | Jo | 652 | 10.7 | Lf |
| 685 | 9.1 | Hf | **U Aqr** | | | *222867* | | | 667 | 8.9 | Ar | 682 | 10.2 | Kn | 653 | 10.7 | Ar |
| 686 | 9.1 | Ra | *215717* | | | 624[ | 13.5 | Ht | 668 | 9.1 | My | 682 | 9.9 | Ah | 653 | 10.7 | Hk |
| 687 | 9.9 | Mc | 661[ | 12.2 | Pt | 636[ | 13.5 | Ht | 668 | 9.2 | Jo | 691 | 10.3 | Pt | 653 | 10.7 | Af |
| 689 | 7.4 | Es | 691[ | 13.2 | Pt | **W Cep** | | | 669 | 9.0 | Kn | 692 | 10.9 | Hf | 654 | 10.8 | Cy |
| 690 | 9.0 | Wp | **TW Peg** | | | 223257 | | | 669 | 9.0 | Ru | **W Peg** | | | 654 | 11.0 | Ko |
| 690 | 8.4 | Jo | 215927 | | | 637 | 7.8 | Lt | 670 | 8.5 | Jo | 231425 | | | 655 | 10.7 | Ar |
| 691 | 8.2 | Pt | 635 | 7.8 | Lt | **T Tuc** | | | 677 | 8.6 | Hf | 636 | 10.5 | Jo | 655 | 10.7 | Af |
| 691 | 8.9 | Ba | 642 | 7.8 | Lt | *223462* | | | 677 | 8.1 | Wp | 642 | 10.5 | Jo | 655 | 11.0 | Jo |
| **RU Cyg** | | | **RT Peg** | | | 624 | 9.4 | Ht | 677 | 8.0 | Sq | 649 | 10.6 | Jo | 655 | 10.8 | Pb |
| 213753 | | | 215934 | | | 631 | 9.1 | Ht | 678 | 8.2 | Sf | 653 | 10.7 | Jo | 656 | 10.6 | Pb |
| 635 | 7.8 | Jo | 667 | 13.3 | Bs | 636 | 8.9 | Ht | 680 | 8.5 | Wp | 661 | 10.8 | Jo | 656 | 11.0 | Hr |
| 637 | 8.0 | Jo | 680 | 12.8 | Ma | 655 | 8.7 | En | 680 | 8.2 | Ah | 667 | 11.6 | Ar | 658 | 10.8 | Cy |
| 641 | 8.0 | Jo | **RY Peg** | | | **R Lac** | | | 680 | 8.4 | Jo | 667 | 11.3 | Jo | 658 | 10.7 | Pb |
| 649 | 8.1 | Jo | 220133a | | | 223841 | | | 681 | 8.4 | Wd | 679 | 11.8 | Wa | 659 | 10.7 | Pb |
| 651 | 8.8 | Mc | 691 | 9.0 | Pt | 680 | 11.2 | Jo | 682 | 8.2 | Jo | 680 | 11.7 | Jo | 659 | 10.9 | Pk |
| 652 | 7.8 | Ry | **RZ Peg** | | | 680 | 11.7 | So | 682 | 8.0 | Kn | 681 | 12.2 | Wa | 660 | 10.7 | Pb |
| 653 | 7.7 | Jo | 220133b | | | 684 | 11.3 | Mc | 682 | 8.1 | Ah | 682 | 11.7 | Jo | 660 | 10.9 | Jo |
| 656 | 9.0 | Mc | 661 | 10.0 | Pt | 686 | 10.6 | Jo | 683 | 7.5 | Wa | 683 | 12.3 | Wa | 661 | 10.7 | Pt |
| 656 | 7.8 | Jo | 686 | 9.0 | Jo | 686 | 10.3 | So | 683 | 8.1 | Hf | 683 | 12.1 | Wp | 661 | 10.7 | Pb |
| 658 | 8.1 | Cy | **T Peg** | | | 691 | 9.8 | So | 683 | 7.8 | Wp | **S Peg** | | | 662 | 10.7 | Pb |
| 660 | 9.0 | Mc | 220412 | | | 692 | 10.5 | Hf | 685 | 7.8 | Sx | 231508 | | | 662 | 10.5 | Ar |
| 661 | 7.9 | Pt | 667 | 12.7 | Ar | **S Aqr** | | | 685 | 7.9 | My | 653 | 9.4 | Jo | 663 | 10.6 | Ar |
| 666 | 7.4 | Ry | 678[ | 13.2 | Hi | *225120* | | | 689 | 7.7 | Ra | 654 | 9.6 | Fi | 663 | 10.6 | Lf |
| 667 | 8.2 | Jo | **Y Peg** | | | 663[ | 12.0 | Mw | 689 | 8.0 | Ru | 656 | 9.2 | Jo | 664 | 10.7 | Pb |
| 668 | 7.6 | Cl | 220613 | | | **RW Peg** | | | 690 | 7.7 | Jo | 661 | 8.6 | Pt | 665 | 10.7 | Ar |
| 670 | 8.0 | Jo | 667 | 14.0 | Ar | 225914 | | | 690 | 7.7 | Wp | 667 | 8.8 | Ar | 665 | 10.7 | Hk |
| 671 | 7.5 | Ry | **RS Peg** | | | 652 | 13.0 | Ar | 691 | 7.3 | Pt | 670 | 8.7 | Jo | 665 | 10.7 | Pb |
| 676 | 8.1 | Jo | 220714 | | | 667 | 11.7 | Hk | 692 | 7.9 | Hf | 677 | 8.2 | Sq | 666 | 10.7 | Ar |
| 677 | 7.6 | Ry | 667 | 14.1 | Ar | 667 | 11.8 | Pb | 693 | 7.8 | My | 677 | 8.4 | Wp | 666 | 10.7 | Pb |
| 681 | 8.0 | Jo | **X Aqr** | | | 669 | 11.5 | Pb | 697 | 7.7 | My | 677 | 8.5 | Hf | 667 | 10.7 | Ar |
| 683 | 9.0 | Mc | *221321* | | | 669 | 11.5 | Lf | **V Cas** | | | 680 | 8.3 | Jo | 667 | 10.8 | Hk |
| 686 | 9.0 | Mc | 656 | 11.4 | Jo | 669 | 11.5 | Fr | 230759 | | | 681 | 8.3 | Wd | 667 | 10.7 | Pb |
| 691 | 8.2 | Pt | 663 | 10.5 | Mw | 670 | 11.7 | Hk | 635 | 8.3 | Jo | 682 | 8.4 | Jo | 669 | 10.7 | Ar |
| 692 | 8.9 | Mc | 665 | 10.3 | Mw | 670 | 11.6 | Pb | 637 | 8.4 | Jo | 683 | 8.3 | Wp | 669 | 10.7 | Af |
| **RV Cyg** | | | 668 | 10.0 | BH | 670 | 11.6 | Tr | 642 | 8.4 | Jo | 683 | 8.3 | Hf | 669 | 10.7 | Lf |
| 213937 | | | 677 | 9.3 | Wp | 671 | 11.5 | Pb | 649 | 8.7 | Jo | 683 | 8.0 | Wa | 669 | 10.7 | Pb |
| 661 | 6.7 | Pt | 679 | 8.7 | Jo | 674 | 11.6 | Pb | 653 | 8.8 | Jo | 686 | 8.2 | Jo | 669 | 10.7 | Tr |
| 691 | 6.5 | Pt | 680 | 9.2 | Wp | 675 | 11.8 | Pb | 653 | 9.3 | Sq | 690 | 8.4 | Jo | 670 | 10.7 | Tr |
| **RR Peg** | | | 681 | 9.0 | Wp | 675 | 11.6 | Tr | 654 | 9.2 | Ko | 691 | 8.0 | Pt | 670 | 10.7 | Pb |
| 214024 | | | 682 | 8.7 | Jo | 675 | 11.8 | Hk | 656 | 8.8 | Jo | 692 | 8.2 | Hf | 670 | 10.6 | Hk |
| 655 | 11.1 | Ma | 683 | 9.0 | Wa | 678 | 12.0 | Hk | 656 | 9.6 | Ra | **V Phe** | | | 670 | 10.7 | Ar |
| 661 | 11.9 | Pt | 683 | 9.0 | Wp | 678 | 12.0 | Lf | 661 | 9.9 | Pt | *232746* | | | 671 | 10.7 | Ar |
| 680 | 12.3 | Ma | 690 | 9.2 | Wp | 678 | 12.1 | Pb | 661 | 9.3 | Jo | 634 | 13.2 | Ht | 671 | 10.7 | Af |
| 682 | 12.8 | Es | 690 | 8.5 | BH | 683 | 14.2 | Wp | 661 | 9.1 | Kn | 655 | 12.3 | En | 671 | 10.7 | Pb |
| 691 | 13.3 | Pt | **T Gru** | | | 691 | 13.1 | Pt | 667 | 9.7 | Jo | **Z And** | | | 672 | 10.7 | Pb |
| **R Gru** | | | *221938* | | | **R Peg** | | | 674 | 10.0 | Ar | 232848 | | | 674 | 10.7 | Pb |
| *214247* | | | 655 | 11.1 | En | 230110 | | | 674 | 9.9 | Pb | 596 | 11.0 | Cy | 674 | 10.7 | Tr |
| 624 | 12.6 | Ht | **S Gru** | | | 639 | 11.2 | My | 675 | 9.3 | Pb | 608 | 10.8 | Cy | 674 | 10.7 | Af |
| 631 | 12.2 | Ht | *221948* | | | 653 | 9.7 | Jo | 675 | 9.3 | Tr | 609 | 10.8 | Cy | 674 | 10.7 | Fr |
| 636 | 11.9 | Ht | 624[ | 12.8 | Ht | 653 | 10.2 | Ra | 675 | 9.0 | Hk | 613 | 10.8 | Cy | 674 | 10.7 | Lf |
| 655 | 9.9 | En | 636[ | 12.8 | Ht | 657 | 9.4 | Sx | 675 | 9.4 | Fr | 623 | 10.8 | Cy | 674 | 10.7 | Hk |
| | | | 655[ | 12.8 | En | 659 | 9.6 | Jo | 675 | 9.3 | Af | 635 | 10.8 | Cy | 674 | 10.7 | Ar |
| | | | | | | 660 | 9.7 | My | 675 | 9.3 | Ar | 635 | 10.9 | Jo | 675 | 10.6 | Ar |

## Variable Star Observations Received During September, 1934.

| J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Z And** | | | **ST And** | | | **R Aqr** | | | **RR Cas** | | | **R Cas** | | | **W Cet** | | |
| 232848 | | | 233335 | | | *233815* | | | 235053 | | | 235350 | | | *235715* | | |
| 675 | 10.7 | Lf | 660 | 10.4 | My | 679 | 9.6 | Rb | 665 | 11.0 | Bn | 674 | 6.0 | Fr | 691 | 9.6 | Jo |
| 675 | 10.6 | Af | 661 | 10.9 | Jo | 679 | 9.1 | Wa | 671 | 10.8 | Md | 674 | 6.1 | Dh | 680 | 9.7 | Ko |
| 675 | 10.6 | Dh | 665 | 10.3 | My | 680 | 9.8 | Jo | 674 | 11.4 | Ar | 674 | 6.1 | Af | **Y Cas** | | |
| 675 | 10.7 | Hk | 667 | 10.7 | Jo | 680 | 9.6 | Ko | 689 | 11.4 | Ra | 674 | 6.1 | Ar | 235855 | | |
| 675 | 10.6 | Pb | 668 | 10.2 | My | 680 | 9.3 | Kn | 691 | 11.5 | Gy | 674 | 5.9 | Ah | 636 | 10.7 | Jo |
| 675 | 10.7 | Tr | 680 | 10.5 | Jo | 680 | 9.1 | Wa | **R Tuc** | | | 677 | 5.9 | Hf | 640 | 10.3 | Ra |
| 675 | 10.6 | Fr | 682 | 10.4 | Jo | 680 | 9.7 | Ma | *235265* | | | 679 | 6.2 | Se | 655 | 10.5 | Jo |
| 676 | 10.7 | Pb | 685 | 9.8 | My | 681 | 9.1 | Wa | 634 | 13.0 | Ht | 679 | 6.3 | Wd | 660 | 11.0 | Jo |
| 676 | 10.7 | Lf | 686 | 10.3 | Jo | 681 | 9.4 | Rb | 655 | 12.9 | En | 679 | 5.5 | Sq | 667 | 11.0 | Jo |
| 677 | 10.7 | Pb | 691 | 10.3 | Jo | 681 | 9.7 | Jo | **R Cas** | | | 680 | 6.3 | Jo | 674 | 10.7 | Pb |
| 678 | 10.6 | Pb | 691 | 10.0 | Pt | 682 | 9.9 | Jo | 235350 | | | 680 | 5.9 | Mn | 674 | 10.7 | Ar |
| 678 | 10.7 | Lf | 693 | 10.0 | My | 683 | 9.0 | Wp | 625 | 8.8 | Wd | 681 | 6.1 | Se | 675 | 11.1 | Ar |
| 678 | 10.6 | Tr | 697 | 10.0 | My | 683 | 9.3 | Kn | 630 | 9.0 | Mn | 682 | 5.7 | Ah | 675 | 10.8 | Hk |
| 678 | 10.6 | Ar | **R Aqr** | | | 683 | 9.1 | Wa | 636 | 8.6 | Mn | 683 | 5.9 | Hf | 675 | 11.0 | Pb |
| 678 | 10.7 | Hk | *233815* | | | 686 | 9.1 | Wa | 636 | 8.5 | Jo | 686 | 7.0 | Wa | 680 | 11.0 | Jo |
| 679 | 10.6 | Ar | 635 | 10.0 | Jo | 686 | 9.3 | Wp | 640 | 8.2 | Ra | 686 | 6.8 | Wp | 686 | 10.8 | Jo |
| 679 | 10.7 | Lf | 637 | 9.9 | Jo | 686 | 9.9 | Jo | 641 | 8.0 | Jo | 686 | 6.0 | Jo | **SV And** | | |
| 679 | 10.7 | Pb | 641 | 10.0 | Jo | 687 | 9.2 | Kn | 649 | 8.0 | Mn | 690 | 6.1 | Sx | 235939 | | |
| 680 | 10.6 | Ko | 649 | 10.0 | Jo | 689 | 9.5 | Ru | 653 | 7.0 | Sq | 692 | 6.2 | Hf | 636 | 12.3 | Jo |
| 680 | 10.7 | Lf | 653 | 9.9 | Jo | 690 | 9.3 | BH | 655 | 6.8 | Se | 694 | 7.2 | Wh | 654 | 10.8 | Fi |
| 680 | 11.0 | Jo | 655 | 10.0 | Jo | 691 | 9.7 | Jo | 655 | 6.5 | Mn | **Z Peg** | | | 655 | 11.5 | Jo |
| 680 | 10.7 | Ma | 656 | 10.0 | Jo | 691 | 9.3 | Pt | 655 | 7.2 | Jo | 235525 | | | 656 | 11.0 | Jo |
| 683 | 10.5 | Wa | 661 | 9.9 | Jo | **Z Cas** | | | 656 | 6.7 | Se | 655 | 10.6 | Jo | 660 | 11.0 | Jo |
| 683 | 10.7 | Wp | 661 | 9.6 | Pt | *233956* | | | 658 | 5.8 | Ah | 656 | 11.0 | Jo | 663 | 10.1 | Mw |
| 686 | 11.2 | Jo | 663 | 9.5 | Mw | 681 | 14.2 | Wp | 660 | 7.0 | Jo | 661 | 10.3 | Pt | 668 | 10.4 | BH |
| 691 | 10.7 | Pt | 663 | 9.6 | Ch | 681 | 14.2 | Wa | 665 | 6.0 | Sq | 663 | 10.2 | Mw | 668 | 9.6 | Jo |
| 691 | 11.1 | Gy | 665 | 9.6 | Mw | **RR Cas** | | | 667 | 6.5 | Ra | 665 | 10.1 | Mw | 670 | 9.4 | Jo |
| **ST And** | | | 667 | 9.4 | Ra | 235053 | | | 667 | 6.5 | Jo | 670 | 9.5 | Jo | 677 | 9.6 | Wp |
| 233335 | | | 667 | 9.3 | Rb | 633 | 11.3 | Bn | 668 | 6.0 | Wd | 680 | 9.7 | So | 680 | 9.1 | Jo |
| 635 | 10.8 | Jo | 667 | 9.9 | Jo | 636 | 11.7 | Jo | 669 | 6.1 | Hf | 682 | 9.5 | Jo | 680 | 8.7 | Ma |
| 637 | 11.0 | Jo | 668 | 9.5 | BH | 640 | 12.2 | Jo | 670 | 6.4 | Jo | 686 | 9.5 | Wp | 680 | 9.5 | So |
| 639 | 10.5 | My | 670 | 9.1 | Rb | 646 | 11.3 | Ra | 674 | 6.1 | Tr | 686 | 9.7 | So | 681 | 9.4 | Ie |
| 653 | 10.8 | Jo | 670 | 9.7 | Jo | 658 | 11.0 | Es | 674 | 6.2 | Pb | 686 | 9.6 | Wa | 682 | 8.9 | Jo |
| 656 | 10.9 | Jo | 679 | 9.7 | Jo | 660 | 10.9 | Bn | 674 | 6.1 | Hk | 690 | 9.1 | Jo | 686 | 8.8 | Jo |
| | | | | | | | | | | | | 691 | 9.5 | Pt | 690 | 8.8 | Jo |
| | | | | | | | | | | | | 691 | 9.8 | So | 691 | 9.6 | So |

## Rapidly Varying Irregular Variables.

| Star | J.D. | Est. | Obs. | J.D. | Est. | Obs. | Star | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 005840 RX Andromedae— | | | | | | | 005840 RX Andromedae— | | | | | | |
| | 7634.7 | 11.2 | Cy | 7655.5 | 12.2 | Ry | | 7679.6 | 12.0 | Wa | 7683.7 | 11.8 | Wp |
| | 7635.7 | 11.4 | Cy | 7656.5 | 12.2 | Ry | | 7679.7 | 11.6 | Pt | 7685.6 | 11.6 | Wp |
| | 7636.7 | 11.5 | Cy | 7658.7 | 11.6 | Cy | | 7680.6 | 11.7 | Cy | 7685.6 | 11.7 | Wa |
| | 7636.8 | 11.6 | Pt | 7658.7 | 11.6 | Pt | | 7680.6 | 12.2 | Wa | 7685.7 | 11.6 | Pt |
| | 7637.8 | 12.0 | Cy | 7660.6 | 11.5 | Jo | | 7680.7 | 11.6 | So | 7686.7 | 11.5 | Cy |
| | 7638.9 | 12.0 | Pt | 7661.7 | 11.6 | Pt | | 7680.7 | 11.6 | Pt | 7690.6 | 11.7 | Wp |
| | 7650.6 | 12.0 | Cy | 7663.9 | 11.7 | Pt | | 7681.4 | 12.1 | Ry | 7690.7 | 11.6 | Pt |
| | 7650.7 | 11.6 | Pt | 7667.5 | 12.2 | Ry | | 7681.6 | 11.6 | Cy | 7691.6 | 11.7 | Gy |
| | 7650.7 | 11.3 | Fi | 7667.8 | 12.1 | Ar | | 7683.7 | 11.6 | Cy | 7691.7 | 11.6 | Pt |
| | 7652.6 | 11.7 | Ry | 7667.8 | 12.0 | Hk | | 7683.7 | 12.1 | Wa | 7692.7 | 11.6 | Pt |
| | 7652.7 | 11.7 | Ar | 7667.8 | 11.9 | Pb | 060547 SS Aurigae— | | | | | | |
| | 7653.7 | 11.6 | Pt | 7668.7 | 11.9 | Pt | | 7637.9 | [12.5 | Cy | 7667.5 | 11.4 | Ry |
| | 7653.9 | 12.0 | Hk | 7670.5 | 12.2 | Ry | | 7638.9 | [12.5 | Pt | 7675.9 | 13.8 | Ar |
| | 7653.9 | 11.6 | Ar | 7671.5 | 12.0 | Ry | | 7652.6 | [12.5 | Ry | 7683.7 | 14.5 | Wa |
| | 7654.5 | 12.1 | Ry | 7673.5 | 12.0 | Ry | | 7654.6 | [11.5 | Ry | 7685.8 | [13.9 | Ie |
| | 7654.7 | 12.1 | Fi | 7677.6 | 11.7 | Wp | | 7655.9 | [12.5 | Pt | 7691.7 | [12.5 | Gy |
| | 7654.7 | 12.0 | Cy | 7679.4 | 11.7 | Ry | | 7663.9 | 10.9 | Pt | 7692.9 | [12.5 | Pt |

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| Star | J.D. | Est. | Obs. | J.D. | Est. | Obs. |
|---|---|---|---|---|---|---|
| 074922 U GEMINORUM— | | | | | | |
| | 7691.8 | [13.3 | Ie | 7692.9 | [13.3 | Pt |
| 081473 Z CAMELOPARDALIS— | | | | | | |
| | 7626.6 | 13.1 | Cy | 7658.7 | 11.7 | Pt |
| | 7634.7 | 11.8 | Pt | 7659.8 | 11.9 | Md |
| | 7635.6 | 12.1 | Cy | 7660.7 | 11.7 | Pt |
| | 7635.7 | 11.8 | Jo | 7660.8 | 12.5 | Md |
| | 7635.7 | 11.5 | Pt | 7661.7 | 12.1 | Pt |
| | 7636.7 | 12.0 | Pt | 7663.9 | 12.6 | Pt |
| | 7636.7 | 11.9 | Cy | 7667.4 | 12.9 | Ry |
| | 7637.8 | 12.6 | Cy | 7667.7 | 12.4 | Pt |
| | 7638.9 | 12.8 | Pt | 7668.7 | 12.6 | Pt |
| | 7649.7 | 12.5 | Pt | 7671.5 | 12.9 | Ry |
| | 7650.6 | 12.2 | Cy | 7673.5 | 11.1 | Ry |
| | 7650.7 | 12.3 | Pt | 7675.5 | 11.0 | Ry |
| | 7652.5 | 10.6 | Ry | 7676.4 | 11.2 | Ry |
| | 7653.7 | 11.0 | Jo | 7677.4 | 11.7 | Ry |
| | 7653.7 | 10.9 | Pt | 7677.7 | 11.3 | Pt |
| | 7654.4 | 10.9 | Ry | 7677.7 | 11.5 | Md |
| | 7654.6 | 10.9 | Ko | 7679.4 | 12.0 | Ry |
| | 7654.7 | 10.9 | Cy | 7679.7 | 11.8 | Pt |
| | 7655.4 | 11.1 | Ry | 7679.7 | 11.8 | Md |
| | 7655.7 | 11.3 | Jo | 7680.7 | 11.8 | Pt |
| | 7655.9 | 11.1 | Pt | 7680.8 | 12.5 | Md |
| | 7656.7 | 10.8 | Md | 7685.7 | 12.8 | Pt |
| | 7657.7 | 11.5 | Md | 7690.7 | 12.8 | Pt |
| | 7658.6 | 11.6 | Cy | 7691.7 | 13.1 | Pt |
| | 7658.7 | 11.7 | Md | 7692.7 | 12.7 | Pt |
| *174406* RS OPHIUCHI— | | | | | | |
| | 7623.1 | 11.4 | Kd | 7658.6 | 11.1 | Wd |
| | 7623.3 | 11.8 | Jo | 7658.7 | 11.6 | Pt |
| | 7623.7 | 11.7 | Cy | 7661.1 | 11.6 | Jo |
| | 7626.7 | 11.6 | Cy | 7661.7 | 11.2 | Pt |
| | 7628.8 | 11.6 | Hi | 7661.7 | 11.6 | Kn |
| | 7629.3 | 11.7 | Jo | 7664.6 | 11.9 | Wa |
| | 7634.3 | 11.8 | Jo | 7667. | 11.1 | Rb |
| | 7634.7 | 11.4 | Cy | 7667.6 | 11.7 | Jo |
| | 7635.6 | 11.5 | Jo | 7668.7 | 11.2 | Pt |
| | 7635.7 | 11.4 | Cy | 7671.6 | 10.1 | Sh |
| | 7636. | 11.8 | Bg | 7671.6 | 11.4 | Wd |
| | 7636.7 | 11.5 | Cy | 7671.7 | 11.7 | Wa |
| | 7636.8 | 11.6 | Pt | 7676.6 | 11.8 | Wa |
| | 7637.6 | 11.6 | Jo | 7676.7 | 11.6 | Hi |
| | 7637.8 | 11.8 | Cy | 7677.5 | 11.9 | Wa |
| | 7639.8 | 11.6 | Hi | 7677.6 | 11.5 | Wd |
| | 7640.7 | 11.8 | Ra | 7677.7 | 11.6 | Pt |
| | 7642.6 | 11.7 | Jo | 7678.6 | 11.4 | Cy |
| | 7649.6 | 11.9 | Fi | 7678.6 | 12.0 | Wa |
| | 7649.7 | 11.6 | Pt | 7679.4 | 11.6 | Ry |
| | 7650.6 | 11.6 | Fi | 7679.6 | 11.9 | Wa |
| | 7650.6 | 11.7 | Cy | 7679.6 | 11.8 | Kn |
| | 7651.7 | 11.8 | Hi | 7679.7 | 11.3 | Pt |
| | 7653.6 | 11.3 | Ko | 7680.6 | 11.4 | Cy |
| | 7653.7 | 11.5 | Pt | 7680.6 | 11.6 | Jo |
| | 7654.7 | 11.6 | Cy | 7680.6 | 12.0 | Wa |
| | 7655.5 | 11.8 | Ry | 7680.6 | 11.4 | Ko |
| | 7655.6 | 12.0 | Wd | 7680.6 | 11.7 | Wd |
| | 7656.1 | 12.0 | Ch | 7681. | 12.2 | Rb |
| | 7656.6 | 11.6 | Jo | 7681.4 | 11.7 | Ry |
| | 7658.6 | 11.0 | Cy | 7681.6 | 11.1 | Cy |
| | | | | 7681.6 | 12.0 | Wa |
| | | | | 7681.6 | 12.0 | Wp |
| | | | | 7682.6 | 11.6 | Kn |
| | | | | 7683.6 | 11.1 | Cy |
| | | | | 7684.7 | 11.6 | Hi |
| | | | | 7685.7 | 11.6 | Hi |
| | | | | 7686.6 | 11.1 | Cy |
| | | | | 7686.6 | 11.6 | Kn |
| | | | | 7686.7 | 11.3 | Hi |
| 202946 SZ CYGNI— | | | | | | |
| | 7634.7 | 9.4 | Pt | 7663.7 | 9.6 | Pt |
| | 7635.7 | 9.6 | Pt | 7664.7 | 9.6 | Pt |
| | 7636.7 | 9.6 | Pt | 7667.7 | 9.1 | Pt |
| | 7637.7 | 9.0 | Pt | 7668.7 | 9.0 | Pt |
| | 7638.7 | 8.8 | Pt | 7677.7 | 9.6 | Pt |
| | 7649.9 | 9.7 | Pt | 7678.7 | 9.5 | Pt |
| | 7650.7 | 9.5 | Pt | 7679.7 | 9.5 | Pt |
| | 7653.7 | 9.0 | Pt | 7680.7 | 9.5 | Pt |
| | 7654.7 | 9.3 | Pt | 7685.7 | 9.0 | Pt |
| | 7655.9 | 9.1 | Pt | 7690.7 | 9.6 | Pt |
| | 7658.7 | 9.6 | Pt | 7691.7 | 9.6 | Pt |
| | 7660.7 | 9.6 | Pt | 7692.9 | 9.7 | Pt |
| | 7661.7 | 9.6 | Pt | 7693.7 | 9.6 | Pt |
| 213843 SS CYGNI— | | | | | | |
| | 7566.9 | 11.9 | Ma | 7642.6 | 11.9 | Jo |
| | 7569.9 | 11.9 | Ma | 7642.7 | 11.8 | Bc |
| | 7588.7 | 8.6 | Ma | 7643.6 | 11.5 | Cy |
| | 7589.7 | 9.3 | Ma | 7646.7 | 12.0 | Ra |
| | 7592.7 | 10.5 | Ma | 7649.6 | 11.8 | Jo |
| | 7602.7 | 11.9 | Ma | 7649.6 | 11.4 | Fi |
| | 7604.7 | 11.0 | Ma | 7649.9 | 11.8 | Pt |
| | 7609.7 | 11.9 | Ma | 7650.6 | 12.0 | Cy |
| | 7613.7 | 11.9 | Ma | 7650.6 | 12.1 | Fi |
| | 7621.9 | 11.9 | Ma | 7650.7 | 11.9 | Pt |
| | 7623.8 | 11.2 | Ma | 7651.8 | 11.9 | Ar |
| | 7626.7 | 11.5 | Bg | 7651.7 | 12.0 | Pk |
| | 7629.9 | 11.2 | Ra | 7652.0 | 11.8 | Hr |
| | 7631.8 | 11.4 | Ra | 7652.7 | 12.0 | Ar |
| | 7634.7 | 11.7 | Pt | 7652.7 | 12.0 | Af |
| | 7634.7 | 11.5 | So | 7652.7 | 12.0 | Pk |
| | 7635.1 | 11.8 | Ch | 7652.7 | 11.9 | Mw |
| | 7635.6 | 12.0 | Jo | 7652.8 | 12.0 | Ar |
| | 7635.7 | 11.7 | Pt | 7653.6 | 11.9 | Jo |
| | 7636.6 | 12.0 | Jo | 7653.6 | 12.0 | Wd |
| | 7636.7 | 11.7 | Bc | 7653.7 | 12.0 | Ra |
| | 7636.7 | 11.8 | Bg | 7653.7 | 11.7 | Pt |
| | 7636.7 | 11.8 | Pt | 7653.7 | 11.9 | Pk |
| | 7636.8 | 11.4 | Cy | 7653.8 | 12.1 | Ar |
| | 7636.8 | 11.7 | Ma | 7653.8 | 12.1 | Af |
| | 7637.6 | 11.6 | Cy | 7653.8 | 12.1 | Fr |
| | 7637.6 | 12.0 | Jo | 7653.8 | 12.2 | Hk |
| | 7637.7 | 11.7 | Pt | 7653.9 | 12.0 | Ar |
| | 7638.0 | 11.8 | Hr | 7653.9 | 12.1 | Hk |
| | 7638.7 | 11.6 | Pt | 7654.6 | 12.1 | Ko |
| | 7640.6 | 11.9 | Jo | 7654.6 | 12.3 | Fi |
| | 7640.7 | 11.8 | Ra | 7654.6 | 11.8 | So |
| | 7641.1 | 11.9 | Ch | 7654.6 | 12.1 | Wd |
| | 7641.6 | 12.0 | Jo | 7654.7 | 11.7 | Pt |
| | 7641.8 | 11.8 | Ma | 7654.7 | 11.9 | Pk |

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| Star | J.D. | Est.Obs. | J.D. | Est.Obs. | Star | J.D. | Est.Obs. | J.D. | Est.Obs. |
|---|---|---|---|---|---|---|---|---|---|
| 213843 SS CYGNI— | | | | | 213843 SS CYGNI— | | | | |
| | 7654.7 | 12.0 Cy | 7662.7 | 11.5 Af | | 7667.7 | 8.4 Af | 7671.6 | 8.6 Af |
| | 7655.0 | 11.8 Hr | 7662.7 | 11.5 Fr | | 7667.7 | 8.4 Hk | 7671.6 | 8.7 Tr |
| | 7655.6 | 11.9 Wd | 7662.7 | 11.7 Lf | | 7667.7 | 8.4 Pb | 7671.6 | 8.7 Jo |
| | 7655.6 | 11.9 Jo | 7662.8 | 11.2 Ar | | 7667.7 | 8.4 Tr | 7671.6 | 8.2 Sh |
| | 7655.7 | 12.0 Ar | 7662.8 | 11.0 Ar | | 7667.7 | 8.2 Pt | 7671.6 | 8.6 Wa |
| | 7655.7 | 12.0 Af | 7662.8 | 11.6 Ar | | 7667.7 | 8.6 Pk | 7671.6 | 8.2 Wd |
| | 7655.7 | 12.0 Pb | 7662.8 | 11.2 Fr | | 7667.7 | 8.5 Bc | 7671.7 | 8.5 Bc |
| | 7655.7 | 12.0 Lf | 7662.8 | 11.0 Fr | | 7667.7 | 8.1 Wd | 7671.7 | 8.8 Fr |
| | 7655.7 | 12.0 Tr | 7662.8 | 11.6 Fr | | 7667.7 | 8.2 Mz | 7671.7 | 8.4 Lf |
| | 7655.9 | 12.0 Ma | 7662.8 | 11.2 Pb | | 7667.8 | 8.6 Ar | 7671.7 | 8.6 Pb |
| | 7656.0 | 11.7 Hr | 7662.8 | 11.0 Pb | | 7667.8 | 8.4 Hk | 7671.7 | 8.7 Pb |
| | 7656.1 | 12.1 Ch | 7662.8 | 11.6 Pb | | 7667.8 | 8.4 Pb | 7671.7 | 8.2 Mz |
| | 7656.6 | 11.9 Jo | 7662.8 | 11.6 Hu | | 7667.9 | 8.6 Ar | 7671.8 | 8.4 Mz |
| | 7656.7 | 11.8 Ra | 7662.8 | 11.2 Pk | | 7669.7 | 8.4 Sx | 7672.6 | 8.7 Ar |
| | 7656.7 | 11.9 Pb | 7662.8 | 11.3 Md | | 7668.6 | 8.3 Wd | 7672.6 | 8.4 Hk |
| | 7656.7 | 12.0 Pk | 7662.8 | 10.9 Bc | | 7668.6 | 8.5 Ko | 7672.6 | 8.4 Lf |
| | 7657.0 | 11.9 Hr | 7662.8 | 11.8 Ar | | 7668.6 | 8.5 Jo | 7672.6 | 8.4 Tr |
| | 7657.1 | 12.0 Ch | 7663.2 | 10.4 Ch | | 7668.7 | 8.4 Wd | 7672.6 | 8.4 Fi |
| | 7657.7 | 12.0 Md | 7663.6 | 10.3 Lf | | 7668.7 | 8.5 Pt | 7672.6 | 8.4 Wa |
| | 7657.8 | 12.0 Pk | 7663.6 | 10.3 Tr | | 7668.7 | 8.6 Pk | 7672.6 | 8.7 Bc |
| | 7658.5 | 12.0 Ah | 7663.7 | 10.3 Ar | | 7668.8 | 8.9 Wa | 7672.6 | 8.4 Wp |
| | 7658.6 | 12.1 Ar | 7663.7 | 10.2 Ar | | 7668.8 | 8.7 Md | 7672.7 | 8.5 Af |
| | 7658.6 | 12.1 Af | 7663.7 | 10.0 Pk | | 7668.8 | 8.3 Mz | 7672.7 | 8.6 Pb |
| | 7658.6 | 12.1 Wd | 7663.7 | 10.4 Pt | | 7668.8 | 8.8 Wp | 7672.7 | 8.5 Md |
| | 7658.6 | 12.0 Cy | 7663.7 | 10.3 Mw | | 7668.9 | 8.5 Sx | 7674.4 | 8.5 Ah |
| | 7658.7 | 11.8 Pt | 7663.7 | 10.2 Ru | | 7668.9 | 8.6 Mz | 7674.6 | 8.7 Ar |
| | 7658.7 | 12.2 Lf | 7663.7 | 10.2 Lf | | 7669.6 | 8.7 Ar | 7674.6 | 8.6 Af |
| | 7658.7 | 12.1 Pb | 7663.8 | 9.8 Bc | | 7669.6 | 8.6 Af | 7674.6 | 8.7 Dh |
| | 7658.7 | 11.9 Pk | 7664.6 | 9.3 Wa | | 7669.6 | 8.6 Fr | 7674.6 | 8.7 Gw |
| | 7659.6 | 11.9 Jo | 7664.6 | 9.8 Rb | | 7669.6 | 8.5 Lf | 7674.6 | 8.6 Hk |
| | 7659.7 | 12.0 Ar | 7664.7 | 9.6 Pt | | 7669.6 | 8.5 Tr | 7674.6 | 8.6 Lf |
| | 7659.7 | 12.2 Hk | 7664.7 | 9.4 Pk | | 7669.6 | 8.5 Jo | 7674.6 | 8.7 Pb |
| | 7659.7 | 12.0 Pb | 7665.7 | 9.2 Ar | | 7669.6 | 8.3 So | 7674.6 | 8.7 Tr |
| | 7659.7 | 11.9 Pk | 7665.7 | 9.3 Af | | 7669.6 | 8.4 Wa | 7674.7 | 8.6 Pk |
| | 7659.8 | 11.8 Pk | 7665.7 | 9.2 Pb | | 7669.6 | 8.3 Wd | 7674.7 | 8.7 Fr |
| | 7659.8 | 12.1 Pb | 7665.8 | 9.2 Mw | | 7669.6 | 8.5 Wp | 7674.8 | 8.7 Ar |
| | 7660.6 | 11.9 Jo | 7666.1 | 8.4 Ch | | 7669.7 | 8.7 Ar | 7674.8 | 8.7 Af |
| | 7660.7 | 12.0 Pb | 7666.6 | 8.8 Ar | | 7669.7 | 8.7 Pb | 7674.8 | 8.7 Fr |
| | 7660.7 | 12.1 Fr | 7666.6 | 8.8 Af | | 7669.7 | 8.8 Pb | 7674.8 | 8.7 Lf |
| | 7660.7 | 12.0 Ar | 7666.6 | 8.8 Fr | | 7669.7 | 8.6 Bc | 7675.6 | 8.8 Ar |
| | 7660.7 | 12.0 Af | 7666.6 | 8.3 Lf | | 7669.7 | 8.2 Ru | 7675.6 | 8.8 Af |
| | 7660.7 | 11.9 Pt | 7666.6 | 8.7 Pb | | 7669.8 | 8.2 Mz | 7675.6 | 8.9 Fr |
| | 7660.8 | 11.6 Pk | 7666.6 | 8.3 So | | 7669.8 | 8.4 Mz | 7675.6 | 8.7 Hk |
| | 7661.6 | 11.9 Hf | 7666.7 | 8.3 Ar | | 7669.9 | 8.6 Mz | 7675.6 | 8.7 Tr |
| | 7661.6 | 11.8 Jo | 7666.7 | 8.4 Gw | | 7670.0 | 8.6 Hr | 7675.6 | 8.6 Wd |
| | 7661.6 | 12.0 Wd | 7666.7 | 8.4 Lf | | 7670.2 | 8.2 Ch | 7675.7 | 8.8 Af |
| | 7661.7 | 11.9 Pk | 7666.7 | 8.5 Ra | | 7670.6 | 8.3 Wd | 7675.7 | 8.8 Dh |
| | 7661.7 | 11.8 Pt | 7666.7 | 8.6 Pb | | 7670.6 | 8.4 Wp | 7675.7 | 8.7 Gw |
| | 7662.1 | 12.1 Ch | 7666.7 | 8.5 Tr | | 7670.6 | 8.5 Gw | 7675.7 | 8.8 Lf |
| | 7662.6 | 12.0 Ar | 7666.7 | 8.6 Pk | | 7670.6 | 8.5 Jo | 7675.7 | 8.7 Tr |
| | 7662.6 | 11.6 Ar | 7666.8 | 8.3 Pb | | 7670.6 | 8.3 Wa | 7675.7 | 8.8 Bc |
| | 7662.6 | 12.0 Af | 7667.6 | 8.4 Rb | | 7670.7 | 8.4 Ar | 7675.7 | 8.8 Md |
| | 7662.6 | 11.9 Fr | 7667.6 | 8.4 Gw | | 7670.7 | 8.4 Hk | 7675.8 | 8.8 Ar |
| | 7662.6 | 12.0 Pb | 7667.6 | 8.8 Bs | | 7670.7 | 8.5 Lf | 7675.8 | 8.8 Dh |
| | 7662.6 | 11.6 Pb | 7667.6 | 8.4 Jo | | 7670.7 | 8.4 Pb | 7675.8 | 8.7 Hk |
| | 7662.6 | 12.0 Tr | 7667.6 | 8.3 So | | 7670.7 | 8.6 Tr | 7675.8 | 8.8 Pb |
| | 7662.7 | 11.5 Hu | 7667.6 | 8.3 Wa | | 7670.8 | 8.6 Md | 7675.8 | 8.8 Pb |
| | 7662.7 | 11.5 Pb | 7667.6 | 8.3 Wp | | 7671.6 | 8.7 Rb | 7675.9 | 8.8 Ar |
| | 7662.7 | 11.5 Ar | 7667.7 | 8.4 Ar | | 7671.6 | 8.7 Ar | 7675.9 | 8.7 Hk |

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| Star | J.D. | Est.Obs. | J.D. | Est.Obs. | Star | J.D. | Est.Obs. | J.D. | Est.Obs. |
|---|---|---|---|---|---|---|---|---|---|
| 213843 SS CYGNI— | | | | | 213843 SS CYGNI— | | | | |
| | 7675.9 | 8.8 Pb | 7678.7 | 9.9 Tr | | 7680.6 | 10.5 So | 7683.8 | 12.0 Md |
| | 7676.2 | 8.8 Ch | 7678.7 | 10.0 Pt | | 7680.6 | 10.5 Wa | 7685.5 | 11.9 Hf |
| | 7676.6 | 9.0 Ar | 7678.7 | 10.0 Hu | | 7680.6 | 11.1 Hf | 7685.6 | 12.0 Wa |
| | 7676.6 | 8.9 Lf | 7678.7 | 10.1 Pk | | 7680.6 | 10.5 Sf | 7685.6 | 12.1 Wd |
| | 7676.6 | 9.0 Pb | 7678.8 | 9.9 Hk | | 7680.6 | 10.9 Wd | 7685.6 | 12.0 Wp |
| | 7676.6 | 8.9 Tr | 7678.8 | 9.8 Ar | | 7680.6 | 10.5 Wp | 7685.7 | 12.0 Ra |
| | 7676.6 | 9.4 Jo | 7678.8 | 9.8 Pb | | 7680.7 | 10.5 Lf | 7685.7 | 12.0 Md |
| | 7676.6 | 8.8 Wa | 7678.8 | 9.8 Tr | | 7680.7 | 11.0 Ma | 7685.7 | 12.0 Es |
| | 7676.6 | 8.8 Hf | 7678.8 | 9.7 Ma | | 7680.7 | 10.7 Pt | 7685.7 | 11.7 Pt |
| | 7676.6 | 8.9 Wd | 7679.5 | 10.2 Hf | | 7680.7 | 11.0 Es | 7686.6 | 12.2 Wp |
| | 7676.6 | 8.9 Wp | 7679.6 | 10.2 Sf | | 7681.5 | 11.3 Sf | 7686.6 | 11.9 So |
| | 7676.7 | 9.0 Es | 7679.6 | 10.2 Wd | | 7681.6 | 11.3 Wp | 7686.6 | 12.1 Wa |
| | 7676.8 | 8.8 Dh | 7679.6 | 10.4 Wp | | 7681.6 | 11.8 Wd | 7686.6 | 12.0 Cy |
| | 7677.5 | 9.2 Hf | 7679.6 | 10.2 Rb | | 7681.6 | 11.1 Rb | 7686.6 | 11.9 Jo |
| | 7677.5 | 9.5 Wa | 7679.6 | 9.9 Dh | | 7681.6 | 11.3 Cy | 7687.7 | 12.0 Es |
| | 7677.6 | 9.8 Ko | 7679.6 | 9.8 Af | | 7681.6 | 11.1 Fi | 7688.8 | 12.2 Es |
| | 7677.6 | 9.6 Ma | 7679.6 | 10.0 So | | 7681.6 | 12.0 Jo | 7689.7 | 12.0 Es |
| | 7677.6 | 9.6 Sf | 7679.6 | 10.2 Wa | | 7681.6 | 11.2 Wa | 7689.7 | 12.0 Ra |
| | 7677.6 | 9.4 Wp | 7679.6 | 8.7 Bc | | 7681.6 | 11.6 Hf | 7690.6 | 12.0 Jo |
| | 7677.6 | 9.5 Wd | 7679.7 | 10.5 Md | | 7681.8 | 11.5 Es | 7690.6 | 12.0 So |
| | 7677.7 | 9.5 Pt | 7679.7 | 10.0 Lf | | 7682.6 | 11.5 Wp | 7690.6 | 12.1 Wa |
| | 7677.7 | 9.4 Es | 7679.7 | 10.5 Pt | | 7682.6 | 11.9 Jo | 7690.6 | 12.0 Wp |
| | 7677.7 | 9.5 Md | 7679.7 | 10.7 Es | | 7682.7 | 12.0 Md | 7690.7 | 11.8 Pt |
| | 7678.6 | 10.3 Gw | 7679.7 | 10.8 Bc | | 7682.7 | 11.4 Wa | 7691.6 | 12.0 Wp |
| | 7678.6 | 9.8 Mc | 7679.8 | 10.0 Ar | | 7682.7 | 11.9 Es | 7691.6 | 12.1 So |
| | 7678.6 | 9.1 Cy | 7680.5 | 10.6 Ah | | 7683.6 | 11.6 So | 7691.6 | 12.1 Wa |
| | 7678.6 | 10.4 So | 7680.6 | 11.0 Ko | | 7683.6 | 11.6 Wa | 7691.6 | 12.0 Jo |
| | 7678.6 | 9.7 Wa | 7680.6 | 10.8 Fi | | 7683.6 | 11.9 Hf | 7691.7 | 12.0 Pt |
| | 7678.6 | 9.8 Sf | 7680.6 | 10.4 Rb | | 7683.6 | 11.9 Jo | 7692.7 | 12.0 Pt |
| | 7678.7 | 9.9 Ar | 7680.6 | 10.6 Ar | | 7683.6 | 11.8 Wp | 7693.7 | 11.9 Pt |
| | 7678.7 | 10.0 Hk | 7680.6 | 10.6 Dh | | 7683.7 | 11.9 Cy | 7693.7 | 12.0 Es |
| | 7678.7 | 9.9 Lf | 7680.6 | 11.0 Cy | | 7683.8 | 12.0 Es | 7697.7 | 12.0 Ma |
| | 7678.7 | 9.9 Pb | | | | | | | |

SUMMARY FOR SEPTEMBER, 1934.

| Observer | Initial | Vars. | Observations | Observer | Initial | Vars. | Observations |
|---|---|---|---|---|---|---|---|
| Ahnert | Ah | 22 | 48 | Frister | Fr | 19 | 68 |
| Armfield, Mrs. | Af | 17 | 101 | Friton | Fn | 4 | 13 |
| Armfield | Ar | 59 | 315 | Gregory | Gy | 43 | 43 |
| Baker | Bp | 3 | 8 | Grunwald | Gw | 11 | 43 |
| Baldwin | Bl | 38 | 64 | Halbach | Hk | 35 | 82 |
| Ballhaussen | Ba | 4 | 19 | Hassler | Hz | 5 | 5 |
| Belsham | Bh | 16 | 19 | Hartmann | Hf | 58 | 116 |
| Brown, A. N. | Bn | 3 | 8 | Heines | Hh | 3 | 4 |
| Brown, S. C. | Bs | 21 | 22 | Hess, A. P. | Hs | 1 | 1 |
| Buckstaff | Bc | 13 | 55 | Hildom, A. | Hi | 17 | 52 |
| Bunting | Bg | 8 | 9 | Hildom, L. | Hl | 5 | 9 |
| Callum | Cl | 3 | 4 | Hood | Ho | 1 | 1 |
| Chandra | Ch | 81 | 116 | Houghton | Ht | 70 | 175 |
| Christman | Cm | 12 | 17 | Houston | Hu | 13 | 20 |
| Cilley | Cy | 42 | 155 | Huruhata | Hr | 11 | 30 |
| Diedrich | Dh | 12 | 28 | Iedema | Ie | 28 | 28 |
| Doolittle | Dl | 2 | 4 | Jones | Jo | 160 | 934 |
| Ellis | Es | 27 | 59 | Kanda | Kd | 7 | 25 |
| Ensor | En | 69 | 184 | King | Kg | 16 | 65 |
| Field | Fi | 19 | 42 | Kirkpatrick | Kp | 9 | 44 |
| Fish | Fs | 9 | 9 | de Kock | Dk | 8 | 35 |

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1934.

| Observer | Initial | Vars. | Observations | Observer | Initial | Vars. | Observations |
|---|---|---|---|---|---|---|---|
| Koons | Kn | 27 | 59 | Rosebrugh | Rb | 9 | 59 |
| Kohman | Ko | 30 | 72 | de Roy | Ry | 11 | 46 |
| Loepfe | Lf | 20 | 113 | Ruben | Ru | 12 | 32 |
| Loreta | Lt | 23 | 55 | Salanave | Sx | 22 | 35 |
| Lucas | Lu | 12 | 48 | Scanlon | So | 40 | 144 |
| Luechinger | Lr | 8 | 15 | Schenkman | Se | 8 | 32 |
| Marsh | Ma | 28 | 52 | Seger | Ss | 2 | 26 |
| McKnelly | My | 24 | 103 | Shinkfield | Sl | 16 | 36 |
| McLeod | Mc | 31 | 98 | Shultz | Sz | 4 | 4 |
| Mennella | Mn | 17 | 98 | Simpson | Si | 3 | 31 |
| Menzel | Mz | 8 | 8 | Smith, A. P. | Sp | 15 | 19 |
| Miczaiha | Mi | 1 | 3 | Smith, F. P. | Sq | 21 | 40 |
| Millard | Md | 28 | 98 | Smith, F. W. | Sf | 10 | 18 |
| Miller | Mw | 14 | 20 | Smith, L. | Sh | 6 | 6 |
| Monnig | Mg | 13 | 17 | Thurow | Tr | 22 | 97 |
| Peck | Pb | 45 | 245 | Wade | Wh | 11 | 15 |
| Peltier | Pt | 212 | 514 | Walton | Wu | 8 | 8 |
| Perkinson | Pk | 17 | 54 | Watson | Wa | 38 | 135 |
| Preucil | Pf | 13 | 18 | Webb | Wd | 54 | 160 |
| Raphael | Ra | 74 | 133 | Woods | Wp | 33 | 110 |
| Recinsky | Rc | 11 | 52 | | | | |
| | | | | Totals | | 87 | 396 | 6007 |

Again the report is one of which the Association may well be proud; a total of 6000 observations by 87 observers on nearly 400 variables. The activities of the Variable Star Section of the Milwaukee Astronomical Society deserve more than passing mention, eleven members of that Society having contributed over 1100 observations.

Information just received from members announces the rapid rise to maximum of SS Cygni on October 12; the very day predicted. S Apodis is again at or near minimum and R Cor. Bor. still resists our expectancy of finding it on the decrease to minimum. Now that SS Aurigae and U Geminorum are again in positions for favorable observation, close attention should be given to these important variables.

LEON CAMPBELL, Recorder.

October 15, 1934.

# Notes from Amateurs

### Amateur Telescope Makers of Chicago

The October meeting of the Amateur Telescope Makers of Chicago was held at the home of Mr. Edward Katyll, 3416 N. Keating Avenue, Chicago, on Sunday afternoon, October 7.

Although Mr. Katyll has been a member of the club for more than two years and came to the meetings regularly he had not told us about his activities in telescope making. We were very much surprised to find a 12-inch Newtonian set up in his yard all complete with slow motions in right ascension and declination. The mirror is 12-inch Pyrex and the mounting is the double yoke type. The yoke is made of two Ford chassis frames and the tube is made of wood slats held in place by Ford rims. Although it is made of materials which can be obtained cheaply it is a very substantial mounting and leaves nothing to be desired for rigidity and smoothness of motion. It is protected by a shed which rolls on rails

which are ingeniously devised to fold up out of the way. Mr. Katyll has also a 6-inch sun telescope with an unsilvered mirror and a solar wedge prism. Then there were two 7½-inch Pyrex discs polished and figured, ready for mounting and a 4-inch Bausch & Lomb objective for a refractor.

The meeting was opened by Professor Arthur Howe Carpenter, who is president of the club. Professor Carpenter lives in La Grange which is about fourteen miles from Chicago. He read a summary of an article in the La Grange newspaper telling about the proposal to build a small observatory as a project of the La Grange community. Professor Carpenter has promised to donate a 12-inch or 15-inch mirror and to help in the design, construction, and installation of the mounting. The club members promised to help this undertaking in every way possible.

The Village of La Grange will put up the building with local labor. The observatory will be open to the public with someone in charge who will give instruction in the use of the instrument and direct the observations. Time will also be reserved to allow the telescope to be used for astronomical work.

We all enjoyed our meeting at friend Katyll's and congratulate him on his achievements in amateur telescope making. WM. CALLUM, *Secretary.*

1319 W. 78th Street, Chicago, Illinois, October 15, 1934.

## Zodiacal Light Notes

By FRANKLIN W. SMITH

The morning Zodiacal Light was observed from 4:15 to 4:45 E.S.T. on October 13. The northern boundary passed approximately through $\theta$ Leonis, between $\gamma$ and $\zeta$ Leonis, and through $\xi$ Cancri to a point two or three degrees south of $\kappa$ Geminorum. The light-cone could not be traced beyond this point which was at an elongation of about 87° from the sun. The southern edge passed through 15 Sextantis and just north of $\alpha$ Cancri. These reference points locate the cone so that its axis falls approximately along the ecliptic.

The Gegenschein was observed at 11:00 on October 7. It was elliptical in shape with a diameter in longitude of about 10° and a diameter in latitude of about 8°. Its center appeared to be about two or three degrees southeast of $\delta$ Piscium.

Although important theoretical work on the nature of the Zodiacal Light has recently appeared, there are still differences of opinion among observers and for this reason observations should be continued. If the "asteroidal" theory is accepted, the pulsations and other variations in the light which are sometimes reported must be ascribed to changing atmospheric transparency or to similar causes rather than to actual variations in the light itself. While such an explanation is probable, it should not be finally accepted without further investigation because these variations have been reported by competent observers.

407 Scott Ave., Glenolden, Pennsylvania, October 16, 1934.

## General Notes

**The Rittenhouse Astronomical Society of Philadelphia** held a meeting of the Society on Friday, October 19, in the Hall of The Franklin Institute, Twentieth Street and the Parkway. The program was an illustrated lecture by Dr. John A. Miller, Director of the Sproul Observatory, Swarthmore College, on the subject, "The Distances of the Stars."

**Amateur Astronomer.**—The autumn (1934) issue of this quarterly publication of the Amateur Astronomers Association with headquarters at the American Museum of Natural History, New York City, has recently appeared. It is the usual sixteen-page, lithographed pamphlet, containing extended articles on sundials, meteors, the evening sky, and a number of shorter notes. It affords interesting reading for all for whom astronomy in its many aspects has an attraction.

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**An Unusual Halo.**—On June 20, about 7:00 P.M., a number of people in Waynesville and Xenia, Ohio—towns sixteen miles apart—saw a rainbow to the west concave toward the sun, and almost overhead a short arc of reverse colors and convex toward the sun. The sun and the centers of these arcs and the zenith were in a straight line. There were no dense clouds in the sky but many patches of thin high clouds. Is it possible that a reversed arc was produced by sunlight reflected from a distant *eastern* cloudbank and refracted by a thin cloud overhead?

REYBURN MCCLELLAN.

McClellan Hospital, Inc., Xenia, Ohio.

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**The British Association for the Advancement of Science** meeting at Aberdeen, September 5 to 12, 1934, included a symposium on cosmical physics on September 7. Professor E. A. Milne presented a popular account of the significance of absorption lines in stellar spectra; Dr. T. Dunham described his spectrophotometric investigations at the Mount Wilson Observatory and outlined the new spectrographic equipment for the 100-inch Coudé arrangement; Professor O. Struve described his own work on the contours of lines in binaries and then referred to an investigation by Dr. Morgan and Professor Wooten on stellar energy curves in the infra-red. He also described a new microphotometer designed by Dr. Elvey. Professor J. A. Carroll spoke on "The Accuracy of Measurement in Spectrophotometry" and reviewed his results on stellar rotation. Mr. E. G. Williams spoke on "Some Applications of Spectrophotometry to Early-Type Stars." Mr. W. M. H. Greaves gave a summary on spectrophotometric investigations in astronomy. Sir Frank Dysou presided.

On September 11, Mr. C. Young of C. A. Parsons and Company gave an illustrated lecture on "The 74-inch Reflecting Telescope of the David Dunlap Observatory, Toronto University, Canada. Mr. Greaves spoke on "The New 36-inch Reflector at the Royal Observatory, Greenwich." Mr. C. R. Burch gave a brief presentation on "Null Systems for Testing Concave Telescope Mirrors."

On September 10, Sir Arthur Eddington spoke on "Theory of Electric Charge and Mass." Professor Carroll spoke on "Some Applications of Fourier's Transforms." In the afternoon of the same day members of Section A (physics, including cosmical physics) gathered at Muckle Inverey near Braemer, Scotland, for the unveiling of a memorial for Johann von Lamont, a native of Corriemulzie, located about three miles west of Braemer. Lamont (1805-1879) was the director of the observatory in Munich, Bavaria. He is known to astronomers for his observations of the satellites of Uranus and for his discovery, in 1851, of a periodicity in the magnetic observations made at Göttingen and at Munich. This period was later found, by Sir Edward Sabine, to be identical with Schwabe's sun-spot period.

The memorial was unveiled by the Princess Arthur of Connaught, after a brief speech by the President of the British Association, Sir James Jeans.

OTTO STRUVE.